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General Article

THE INCIDENCE OF TUBERCULOSIS AMONG 2,270 CATTLE IN FOUR REARING DISTRICTS IN NORTH WALES

by

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There is reason for deploring the general tendency to regard the accepted estimate of the incidence of tuberculosis in cows in essentially dairy herds (40 per cent.) as the index of the extent of this disease among the cow or even the total cattle population of this country. On the other hand, there have been no good grounds on which a more comprehensive estimate could be based. It was with a view to supplying reliable, even if somewhat restricted, information regarding breeding and rearing districts that the survey here reported was undertaken. This work has now covered four such districts containing 101 farms carrying 2,270 cattle and appears to be of sufficient scope to indicate the tuberculosis position in the cattle breeding and rearing districts of North Wales.

The procedure adopted was set out in a previous article[2] which detailed the work in the first district. The survey has been based on the results of the double intradermal testing, using Cambridge synthetic medium tuberculin, of the cattle over two months old. No unwilling owner was pressed to enter the scheme and the spirit of ready co-operation which exists in these districts is evidenced by the rarity of refusal; more particularly since in certain instances inconvenience of the dates selected for testing was the real reason. It is a pleasure to acknowledge here the co-operation and assistance of the practitioners in whose practices this work was carried out; namely, Mr. W. O. Jones, of Llanrwst; Mr. G. Jones Roberts, of Pwllheli; Mr. R. S. Rowlands, of Abergele; and Mr. J. Ll. Williams, of Bala, and of the owners of the herds.

District A.—The survey of this district, which lies in the centre of an upland breeding and rearing area, was the subject of the previous article. The herds are largely maintained by the purchase of young calves from typical dairying districts. There is a distinct tendency to retain old cows. The buildings are poor in construction, badly lit and ventilated and are very frequently overcrowded. Permission to test was obtained from 20 of the 22 farmers and their stock numbered 450. The results, having been detailed previously, are summarised in Table No. IV. On two farms no reactors were detected and on each of the five farms where there was but one reactor it was a purchased animal. There was the history of a clinical case of tuberculosis having been removed under the Order from each of two of the farms. On one the stock had since been changed, the result of a change of tenancy, but on the other the full effect of the occurrence of an open case was seen in the finding of 45·4 per cent. of reactors. An analysis of the results in the testing of the stock under one year old, which was set out in the previous article, demonstrated that infection in this district is largely imported by the purchase of young calves from milk producing areas. Even so, the presence of 11·8 per cent. of reactors among the total stock of 450 and 23·8 per cent. among 109 cattle of the cow class compared very favourably with the figure usually accepted as the percentage of reactors among cows in dairy herds.

District B.—This district is quite typical of those in which the main cattle industry is the rearing of young stores and of young cows for sale into dairying herds. The stock are almost entirely dairy shorthorns and of good type, since the premium bull scheme has been operating with success in this district for some years. A trade in young dairy cows is established, the custom being to sell each cow just after she has calved the third time. As only an occasional cow calves for the fourth time in the district, the cow population is young. The herds are maintained to some extent by the purchase of young calves from dairy herds but, even in this respect, discretion has been exercised, several of the farmers obtaining calves direct from herds which have a satisfactory history. However, since it is rare to sell in-calf cows, calf purchasing is not so extensive. The district lies around a main valley and its subsidiaries at a height varying from 900 feet to 1,200 feet above sea level. In three instances the shippons have been modernised to some extent but otherwise the buildings are badly constructed, often with a loft which reduces headroom, lighting and ventilation to a minimum. The exposed nature of

the district makes it necessary to house all the horned stock throughout the winter period and a very general tendency to overcrowd is noticeable. None of the farms sells milk but all make butter. With the exception of two bulls, none of the cattle had been tuberculin tested. The general health of the herds appeared good and their history did not indicate the presence of any endemic disease. The quality of the keep was low, little other than home produced fodder being fed. The pig population is small and poultry are kept as barndoor fowls.

There are 42 farms in the district but one owner refused to allow his cattle to be tested. The detailed results of the survey are set out in Table No. I.

It will be seen that no reactors were detected on 28 of these farms. On six of the remaining farms the reactor or reactors had been purchased. Good evidence of infection on the farm, the finding of one or more home-bred reactors, was obtained only in seven instances. Two of these farms, Nos. 5 and 7, accounted for more than one-quarter of the reactors in the district. It was found that an animal had been removed under the Tuberculosis Order from each of these herds. As will be seen from Table No. V, 17 of the 26 reactors were purchased. Here, again, a considerable proportion of the infection was introduced into the district. The incidence of tuberculosis was, however, remarkably low; 4·4 per cent. among the 594 animals tested and 8·9 per cent. among the 212 "cows."

District C.—This district is typical of a considerable number of breeding areas in North Wales in that the main cattle activity is the

TABLE No. I

The Number of Animals Tuberculin Tested and Number of Reactors on each Farm in District B.

Farm	3 years and over		2–3 years		1–2 years		6–12 months		2–6 months		Total		
	Tested	Positive	Tested	Positive	Tested	Positive	Tested	Positive	Tested	Positive	Tested	Positive	% Positive
1	10	1	5	—	9	—	5	—	9	—	38	1	2·6
2	1	—	1	—	—	—	—	—	—	—	2	—	—
3	5	2	1	—	—	—	5	—	—	—	11	2	18·0
4	4	—	—	—	—	—	6	—	—	—	10	—	—
5	6	4	—	—	2	—	2	—	2	—	12	4	33·3
6	8	—	3	—	—	—	8	—	—	—	19	—	—
7	6	3	2	—	1	—	5	—	3	—	17	3	17·6
8	4	—	1	—	4	—	2	—	—	—	11	—	—
9	—	—	2	—	2	—	—	—	—	—	4	—	—
10	8	—	—	—	2	—	1	—	3	—	14	—	—
11	6	1	—	—	3	—	—	—	5	—	14	1	7·1
12	7	—	—	—	2	—	3	—	4	—	16	—	—
13	5	2	—	—	6	—	5	—	7	—	23	2	8·7
14	8	1	2	1	—	—	10	2	2	—	22	4	18·0
15	8	—	—	—	—	—	5	1	5	—	18	1	5·5
16	5	—	3	—	10	—	4	—	13	—	35	—	—
17	6	1	3	1	1	—	8	—	5	—	23	2	8·7
18	16	—	—	—	8	—	16	1	—	—	40	1	2·5
19	8	1	3	1	1	—	8	—	2	—	22	2	9·9
20	5	—	—	—	8	—	2	—	—	—	15	—	—
21	7	—	2	—	—	—	4	—	6	—	19	—	—
22	3	1	—	—	—	—	3	—	3	—	9	1	11·1
23	2	—	—	—	3	—	—	—	—	—	5	—	—
24	3	—	—	—	1	—	—	—	3	—	7	—	—
25	3	—	2	—	1	—	3	—	—	—	9	—	—
26	6	—	1	—	1	—	—	—	6	—	14	—	—
27	4	2	—	—	—	—	—	—	3	—	7	2	28·5
28	1	—	—	—	—	—	—	—	1	—	2	—	—
29	5	—	1	—	3	—	7	—	—	—	16	—	—
30	3	—	1	—	2	—	4	—	2	—	12	—	—
31	2	—	—	—	1	—	1	—	1	—	5	—	—
32	5	—	—	—	1	—	2	—	3	—	11	—	—
33	5	—	—	—	1	—	—	—	7	—	13	—	—
34	5	—	2	—	2	—	7	—	—	—	16	—	—
35	2	—	—	—	—	—	1	—	—	—	3	—	—
36	4	—	3	—	2	—	4	—	—	—	13	—	—
37	4	—	2	—	7	—	4	—	—	—	17	—	—
38	8	—	—	—	—	—	6	—	4	—	18	—	—
39	2	—	—	—	—	—	—	—	—	—	2	—	—
40	5	—	—	—	2	—	2	—	3	—	12	—	—
41	7	—	3	—	2	—	1	—	5	—	18	—	—
Total	212	19	43	3	88	—	144	4	107	—	594	26	4·4

rearing of store stock. With rare exceptions, the cattle are of the Black Welsh breed and while there are many importations they come from even higher, actually mountain and moorland, districts. Purchased calves come chiefly from small upland holdings or from upland farms bordering on certain of the quarrying or coastal districts where there is some sale of milk. In addition a considerable number of store cattle are purchased, particularly in autumn, from mountain districts. There is a large movement of store cattle out of the district in early spring but the sale of cows is small. Consequently, in sharp contrast to district B, the cows on many of the farms are old. The district lies in and around a broad valley which opens from a main road at about 700 feet and rises to an upland moor 1,200 feet above sea level. The buildings are of the type already described but congestion is somewhat relieved by accommodation for young cattle in outlying buildings which have haysheds attached. Butter-making is general. Few of the farms have more than one sow and the poultry generally are housed about the farm buildings. With the exception of an occasional purchased bull, none of the cattle had been tested. Bulls sold from certain herds were known to have passed the test. The herds generally had excellent histories and the Tuberculosis Order is not known to have operated in the district. In one or two instances it appeared that Johne's disease was a source of loss. The winter fodder, all home produced, was fed at little above maintenance level.

With one exception, the 29 farmers readily agreed to allow their stock to be tested. The detailed results for each of the 28 farms are given in Table No. II.

It will be seen that on 20 farms no reactors were detected. In three instances the reactor was a purchased animal so that good evidence of infection from the premises was obtained on only five farms. Table No. V shows that seven of the 13 reactors were purchased. In this district, even bearing in mind the excess of yearling cattle, the incidence of reaction was remarkably low, 1·4 per cent. among the 933 cattle. Although the general age level in the "cow" class was high only nine (3·7 per cent.) reactors were detected among 243 animals.

District D.—In contrast, this is a lowland breeding district; a group of farms situated about 250 feet above sea level. It is, however, quite typical of a large area in which cattle breeding is the main industry. The cattle are

TABLE No. II

THE NUMBER OF ANIMALS TUBERCULIN TESTED AND NUMBER OF REACTORS ON EACH FARM IN DISTRICT C.

Farm	3 years and over		2–3 years		1–2 years		6–12 months		2–6 months		Total		
	Tested	Positive	Tested	Positive	Tested	Positive	Tested	Positive	Tested	Positive	Tested	Positive	% Positive
1	10	—	8	—	7	—	—	—	6	—	31	—	—
2	11	—	1	—	2	—	5	—	6	—	25	—	—
3	12	—	8	—	8	—	6	—	2	—	36	—	—
4	2	—	—	—	1	—	2	—	1	—	6	—	—
5	7	1	2	—	13	—	—	—	5	—	27	1	3·4
6	9	—	—	—	5	—	4	—	8	—	26	—	—
7	13	2	6	—	30	1	7	—	21	—	77	3	3·9
8	10	—	17	—	22	—	—	—	8	—	57	—	—
9	8	—	2	—	15	—	—	—	9	—	34	—	—
10	15	2	16	1	25	—	12	—	9	—	77	3	3·9
11	11	—	12	—	24	—	—	—	9	—	56	—	—
12	7	—	7	—	6	—	4	—	7	—	31	—	—
13	5	—	2	—	4	—	3	—	4	—	18	—	—
14	6	1	1	—	4	—	2	—	3	—	16	1	6·3
15	8	—	1	—	33	1	3	—	12	—	57	1	1·8
16	10	—	6	—	8	—	5	—	4	—	33	—	—
17	6	—	—	—	3	—	3	—	3	—	15	—	—
18	4	—	—	—	6	—	4	—	1	—	15	—	—
19	6	—	16	—	4	—	3	—	1	—	30	—	—
20	9	—	—	—	9	—	7	—	3	—	28	—	—
21	8	—	—	—	13	—	5	—	4	—	30	—	—
22	8	—	—	—	7	—	6	—	2	—	23	—	—
23	7	—	6	1	4	—	3	—	6	—	26	1	3·8
24	11	1	—	—	8	—	11	—	—	—	30	1	3·3
25	9	—	10	—	4	—	3	—	4	—	30	—	—
26	9	2	—	—	9	—	4	—	8	—	30	2	6·6
27	16	—	2	—	12	—	8	—	1	—	39	—	—
28	6	—	4	—	12	—	6	—	2	—	30	—	—
Total	243	9	127	2	298	2	116	—	149	—	933	13	1·4

almost all of the Black Welsh breed and the trade largely the production of stores but the majority of the farms also feed for beef. None sells milk but all make a quantity of butter. Nearly all introduced animals, chiefly calves and yearlings, are purchased locally but some of the farms are almost self-contained. Speaking generally, the buildings in this district are good and the tendency to overcrowding with young cattle, so evident in the other districts, is less marked. Most of the farms keep one or two sows and their progeny. All keep fowls about the farm buildings. Apart from one young bull, none of the animals had previously been tested with tuberculin. The condition of the cattle was good, the level of nutrition being markedly above that of the upland districts.

There were 14 farms in the district but the dates chosen for testing were inconvenient to two farmers and the survey had to be restricted to the remaining twelve farms.

From Table No. III it will be seen that no reactors were detected on seven of the farms. On one farm the two reactors were purchased from the previous tenant who is believed to have introduced each of them. Evidence of infection in the four remaining farms was demonstrated by the detection of home-bred reactors. Particular interest attaches to two of these farms. On Farm No. 3 the stock, with four exceptions (all yearling cattle and non-reactors), were home-bred. There was no history which would suggest that there had been an open case of tuberculosis on the farm and the home-bred stock over two years old were clean. Yet one reactor was found in the one to two years old group and one in the six to twelve months old group. In neither case was the reaction marked. It was found that the poultry on this farm were affected with tuberculosis to a serious extent and that they spent much of their time in the large hayshed. There is, therefore, some ground for believing that the two reactors were affected with avian tuberculosis. On Farm No. 12 the incidence of reaction was particularly high. This was the only farm in this district on which the Tuberculosis Order had had occasion to operate. One cow had been removed a short time prior to the date of testing and one some two years previously. The effect of these open cases is clearly seen from the figures in the table but is made even more evident when the history of the cattle is detailed. *All* the reactors were home-bred stock with the exception of three cows which were purchased locally as yearlings and may well have picked up infection on this farm. Then, of the 27 animals which had spent all or the greater part of their life in the herd 14 (over 50 per cent.) reacted. Five of the 17 home-bred cattle under two years old reacted, whereas none of the ten purchased animals of that age were reactors. It is obvious that the extensive infection present in this stock must raise the level for the district but, even so, only 7·2 per cent. of the 293 cattle reacted and 14·5 per cent. of the 83 animals three years old and over.

Summary of Results

The results for the four districts are summarised in Table No. IV (over-leaf).

The variation from district to district calls for comment. The extensive purchasing of calves from dairying districts combined with the practice of keeping old cows appears to account for the relatively high incidence in district A. While the purchase of calves is a factor introducing infection into district B, it is not so evident. The practice of selling out while the animals are still young, so protecting the premises from becoming sources of infec-

TABLE No. III

The Number of Animals Tuberculin Tested and Number of Reactors on each Farm in District D.

Farm	3 years and over		2–3 years		1–2 years		6–12 months		2–6 months		Total		
	Tested	Positive	Tested	Positive	Tested	Positive	Tested	Positive	Tested	Positive	Tested	Positive	% Positive
1	10	—	—	—	12	—	4	—	8	—	34	—	—
2	4	2	1	—	7	—	1	—	3	—	16	2	12·5
3	9	—	5	—	4	1	7	1	4	—	29	2	6·9
4	3	—	2	—	7	—	4	—	4	—	20	—	—
5	8	—	—	—	11	—	4	—	3	—	26	—	—
6	5	—	2	—	4	—	1	—	5	—	17	—	—
7	5	—	1	—	2	—	4	—	4	—	16	—	—
8	3	1	2	—	1	—	5	1	1	—	12	2	16·6
9	9	—	2	—	7	—	4	—	7	—	29	—	—
10	11	—	10	—	8	—	8	—	4	—	41	—	—
11	7	1	—	—	6	—	3	—	—	—	16	1	6·3
12	9	8	1	1	13	2	14	3	—	—	37	14	37·8
Total	83	12	26	1	82	3	59	5	43	—	293	21	7·2

TABLE No. IV

Summary of Results of Tuberculin Testing in the Four Districts.

District	3 years and over			2–3 years			1–2 years			6–12 months			2–6 months			All ages			No. of Farms	No. of Clean Farms
	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.		
A	109	26	23·8	57	6	10·5	126	6	4·7	103	6	5·8	55	9	16·3	450	53	11·8	20	2
B	212	19	8·9	43	3	6·9	88	—	—	144	4	2·7	107	—	—	594	26	4·4	41	28
C	243	9	3·7	127	2	1·6	298	2	0·7	116	—	—	149	—	—	933	13	1·4	28	20
D	83	12	14·5	26	1	3·8	82	3	3·7	59	5	8·5	43	—	—	293	21	7·2	12	7
Total	647	66	10·2	253	12	4·7	594	11	1·8	422	15	3·5	354	9	2·5	2,270	113	5·0	101	57

tion, further accounts for the lower incidence. In district C the purchase of calves from dairying districts is quite negligible, most of the introduced cattle coming from neighbouring upland districts. This seems to explain the remarkably low incidence of tuberculosis (1·4 per cent.) in the district and affords further illustration of the rarity of infection in the uplands of North Wales. The figures for district D are raised by the high incidence of tuberculosis on one of the farms. In this district, again, the introductions are from local sources and it does appear that even in lowland breeding districts tuberculosis is a real problem only on an occasional farm.

Of the 101 herds tested 57 contained no reactors and in 15 other herds all the home-bred stock were clean. The survey, therefore, has shown that 56 per cent. of the farms were entirely free of infection and that on 71 per cent. there was no evidence that the premises were contaminated. Even bearing in mind that a considerable proportion (71·5 per cent.) of the cattle tested were under three years old, the finding of only 5 per cent. of reactors in these breeding districts is illuminating.

The figures for cattle over three years old, almost all cows, are of particular interest, for the low level of infection in this class (10·2 per cent. reacted) well illustrates the freedom from tuberculosis enjoyed by these herds. This is emphasised by pointing out that 20 of the 66 reactors in this class occurred among the 29 cows (an incidence of 69 per cent.) on the five farms from which an animal had been removed under the Tuberculosis Order. The remaining 96 farms carried a cow stock of 618 among which 46 (7·5 per cent.) of reactors were detected.

In the previous report the unfavourable influence of purchasing in district A was clearly shown by comparing the incidence of infection among home-bred with purchased animals under twelve months. Table No. V sets out the results as they relate to home-bred and to purchased animals in each of the other districts.

TABLE No. V

The Incidence of Reaction among Home-bred and Purchased Animals in Three of the Districts.

District	Class	3 years and over			2–3 years			1–2 years			6–12 months			2–6 months			Total		
		Tested	Pos.	% Pos.	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.
B	Home-bred	161	7	4·3	27	1	3·7	65	—	—	111	1	0·9	76	—	—	440	9	2·0
	Purchased	51	12	23·5	16	2	12·5	23	—	—	33	3	9·1	31	—	—	154	17	11·0
C	Home-bred	189	5	2·6	47	1	2·1	159	—	—	107	—	—	103	—	—	605	6	1·0
	Purchased	54	4	7·4	80	1	1·2	139	2	1·4	9	—	—	46	—	—	328	7	2·1
D	Home-bred	58	7	12·1	21	1	4·8	53	3	5·6	43	5	11·6	29	—	—	204	16	7·8
	Purchased	25	5	20·0	5	—	—	29	—	—	16	—	—	14	—	—	89	5	5·6
Total	Home-bred	408	19	4·7	95	3	3·1	277	3	1·1	261	6	2·3	208	—	—	1,249	31	2·5
	Purchased	130	21	16·2	101	3	2·9	191	2	1·0	58	3	5·2	91	—	—	571	29	5·1

Throughout the age groups in district B the higher incidence among the purchased cattle is distinct. In the case of district C, however, this difference is not so marked and is ascribed to the fact that the introduced stock, be they calves or yearlings, come from very typical upland districts. The comparison in district D is complicated by the heavy infection of the home-bred stock on one farm and by the supposedly avian infection on another. The figures do, however, emphasise the remarkable freedom from infection which characterises stock purchased in true breeding areas. The table, taken in conjunction with that previously published for district A, illustrates clearly the danger to breeding districts which attends the importation of stock, particularly calves from dairying districts.

It is well worth illustrating the influence which the five farms from whose stock an animal had been removed under the Tuberculosis Order have had on the results. In Table No. VI the incidence of reactors on these five farms is compared with that on the remaining 96.

The influence of purchasing is, of course, a complicating factor as is well shown by the history of the nine reactors under six months old, all of which were found on farms of the latter group and all but one of which were purchased. Despite this difficulty, the comparatively high percentage of reactors in each of the other age groups on the five farms is a very significant finding. The low standard of the buildings and the overcrowding on the farms has been noted and it seems that, as one would expect, the sojourn of an open case therein is followed by rapid dissemination of infection among all the stock over six months old. Yet, there were 26 farms from which no animal had been removed under the Order but on which one or more home-bred reactors were detected. In these the incidence was low. One must assume that an open case was present in the stock either some years ago or for a short period only but it is impossible to say how far avian infection accounted for reaction in these cases. On the majority of the farms the poultry were kept under conditions conducive to such a happening and on one there is strong presumptive evidence of its occurrence.

Discussion

Prior to the publication of the article dealing with the survey of district A, there was no real evidence as to the incidence of tuberculosis in purely breeding areas in which there had been no testing. Since then Rabagliati,[5] Moodie[3] and Thomas[4] have reported their observations in somewhat similar work. In each case, however, there was some selection either of the area or of the individual farms which tends to make comparison difficult. Rabagliati tested all the stock on seven almost self-contained farms in an upland valley the history of which suggested relative freedom from tuberculosis. The percentage of reactors among the 171 cattle was 7·6 per cent. and among the cows 16·1 per cent. The relative figures in the North Wales survey are 2,270 cattle with 5 per cent. of reactors and 647 "cows" with 10·2 per cent. of reactors.

The error in taking the estimated incidence of tuberculosis in dairy cows as illustrative of the general position among our cattle population is brought home by this work, for the districts were chosen at random. The relative freedom of these herds is the more surprising when the conditions under which they live are kept in mind. The housing is bad, overcrowding marked and the winter food is poor in quality and somewhat scanty in quantity. Some districts are open to the introduction of infection by the purchase of calves from dairying districts but, on the other hand, are protected to some extent against serious spread of the disease by the practice of selling out the cows while they are still young. The districts, however, appear quite representative and, since almost all the cattle in each were tested, there is good reason for assuming that the results are a true index of the position in the breeding and rearing areas of North Wales at least.

Results of this nature suggest the need for reviewing proposals for the eradication of

TABLE No. VI

The Influence of the Occurrence of Open Cases upon the Incidence of Reactors in the Herds.

Class of Farm	3 years and over			2–3 years			1–2 years			6–12 months			2–6 months			Total		
	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.	Tested	Pos.	% Pos.
Farms on which T.B. Order had operated	29	20	69·0	7	1	14·3	43	4	9·3	29	6	20·7	8	—	—	116	31	26·7
Farms on which T.B. Order had *not* operated	618	46	7·5	246	11	4·5	551	7	1·3	393	9	2·3	346	9	2·6	2,154	82	3·8
Total	647	66	10·2	253	12	4·7	594	11	1·8	422	15	3·5	354	9	2·5	2,270	113	5·0

tuberculosis since, in the past, they have been based mainly on an expected incidence of infection far in excess of that which was present in these districts. The difficulty and cost of disposing of reactors from the great majority of these farms would not be a serious matter were they to attempt eradication. It seems that a good nucleus for the creation of a large supply of cattle free from tuberculosis must exist in many of our breeding areas, yet their cattle often pass to lowland milk-producing farms *via* markets and may well become infected shortly after leaving the clean premises on which they were reared. On the other hand, one is constantly faced with the problem of finding clean replacement stock for dairy herds. Very commonly, cows purchased as clean on the result of a recent test and brought into herds from which tuberculosis has been eradicated, or is in the process of eradication, have come from infected farms, have recently picked up infection and react at the first or second test in their new herds. This is undoubtedly one of the major discouragements which have surrounded the building up of clean dairy herds in this country, for such animals are commonly purchased at or just after calving and their forced sale, through reaction to the test two to six months later, means a heavy loss. The establishment of tuberculosis-free breeding areas in various parts of the country would overcome this difficulty if purchasers were educated up to the need for direct transportation. Free breeding areas are much to be preferred to free breeding farms, for in many upland districts there are peculiar difficulties in the isolation of the stock from that of neighbouring farms.

While the cleaning up of our dairy herds is certainly being encouraged by the schemes now in operation, there has not appeared any officially sponsored scheme which offers the stimulus necessary to the eradication of tuberculosis from breeding areas such as those in which this survey was carried out. It may well be asked whether the Attested Herds Scheme could not be usefully applied. Some of these farmers may yet be influenced to take advantage of its provisions, but this scheme, offering as a major inducement a bonus payment on milk sold through the Milk Marketing Board, was not, of course, designed to meet the needs of these owners. The great majority of the breeders concerned are not "Registered Producers" and do not sell milk. The milk produced is used entirely for stock-rearing and butter-making. It seems doubtful whether the amended scheme, now in the course of preparation, can be made to meet the needs of breeding areas, since the necessary moneys are provided under Section 9 of the Milk Act, 1934, to be expended "with the object of securing so far as practicable that the milk supplied for human consumption in England or in Scotland, as the case may be, is pure and free from the infection of any disease." It might well be contended that the cleaning up of our breeding herds has a real place in bringing about the object of Section 9, but this may not be the official view. In any case, experience in this survey work has shown that some stimulus different in nature from that provided by the existing scheme is necessary if the cattle-rearing farms are to take their proper place in tuberculosis eradication work; in fact, it almost seems that the subsidising of the preliminary test would be essential. It is very doubtful whether even good propaganda would have led any of these breeders to have their stock tested at their own expense. When the survey test had been completed in each of these districts, however, there arose quite a general desire to follow it up by eradication work and, in fact, in district B an observation of this nature has been planned.

One of the principal dangers to the favourable tuberculosis position which appears to exist among rearing herds is certainly the purchasing of calves from dairying districts. Even Jordan,[1] in his work on the eradication of tuberculosis from the dairying district chosen for his experimental observation, found that reactors were not uncommon in the calf class and reached 5·4 per cent. on the occasion of his third six-monthly test. Since his work was done in a district in which some cleaning up of the herds had already been undertaken, it may well be that the level of infection among the calves in untested dairy herds is much higher. Furthermore, the great majority of the calves which reach the rearing areas pass through markets or dealers' premises or both and may, therefore, have much opportunity for becoming infected. In only two of the districts surveyed, A and B, was calf purchasing from dairy districts practised to any appreciable extent and in both it was responsible for the introduction of the greater part of the infection detected. Such districts must purchase calves but the danger of indiscriminate buying should be pointed out and direct transfer of calves, unwanted in clean lowland herds, to the rearing areas should be encouraged.

Summary

(1) The incidence of bovine tuberculosis in four cattle-rearing districts in North Wales was determined by submitting almost all the cattle (other than calves under two months old) in each to the double intradermal tuberculin test.

(2) Of 2,270 cattle on 101 farms, 113 (5 per cent.) reacted to the test.

(3) The percentage of reactors detected in the various age groups was:—

	Per cent. Reacted.
Of 647 cattle 3 years old and over ...	10·2
Of 253 cattle 2 to 3 years old	4·7
Of 594 cattle 1 to 2 years old	1·8
Of 422 cattle 6 to 12 months old ...	3·5
Of 354 calves 2 to 6 months old	2·5

(4) On 57 of the farms no reactors were detected and on an additional 15 farms all the home-bred stock were clean.

(5) On the five farms where the Tuberculosis Order had operated the percentage of reactors was relatively high (26·7 per cent.), comparing very unfavourably with the percentage on the 96 farms where the Order had not operated (3·8 per cent.).

(6) Since these districts were chosen at random and since almost all the cattle in each were tested, it is suggested that the results are representative and indicate that the eradication of tuberculosis from breeding and rearing districts would be relatively easily accomplished provided a suitable stimulus, such as subsidised testing, was provided.

(7) The need for protecting these districts against the introduction of infection by the purchase, through markets, of calves from dairying districts is emphasised.

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GOITRE IN HOUSEHOLD ANIMALS

In the course of an extensive research on the incidence of goitre among the population of Austria the Ministry of Health has advised a search for goitre amongst animals. It is already known that in certain districts of Austria goitre is common in calves. The Ministry has now issued to all veterinary surgeons, as well as the inspectors of cattle markets and butchers' shops, a leaflet in which the following items are to be noted in all cases of animal goitre that they find: age, sex, pedigree, if possible the height at the withers, the circumference of the throat, the approximate size of the enlarged thyroid gland, its consistency, and any pathological conditions resulting from it. Furthermore, the investigator should try to ascertain whether there is goitre in the family of the animal or in the neighbourhood. Similar leaflets have also been issued to gamekeepers to obtain similar information about the deer, chamois, and stags. They also have to report any case of goitre observed in any other animal seen by them. The authorities desire to obtain this information about animals chiefly with a view to the possible use of iodised salt in agricultural and veterinary establishments. The use of this salt on a very large scale by the human population has had excellent results.—*Lancet.*

Clinical Communication

ULCERATIVE NECROSIS OF THE SUPERIOR MAXILLA*

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Brighton

The subject of this case was a well-bred hackney mare—a splendid trapper—of my own. She was 18 years old when I purchased her and except for occasional slight haemorrhage from the nostrils—due to blood pressure through over-exertion—she enjoyed good health.

I had her for 15 years, and about three months before her death I found that she was not masticating her food properly. I rasped her teeth but still there was difficulty. When again examining her mouth I found a loose molar and extracted it.

After a little while she was dribbling on that side and the wound caused by the removal of the tooth had not healed and became very offensive.

Later, a large, discharging swelling appeared and, on two more teeth coming out, I decided she must be slaughtered, though she was in good condition.

It is a remarkable coincidence that my old grey, "Harkaway," 40 years old, was destroyed because of the existence of a similar condition: if I remember rightly, that was on the off side. The horses had not stood in the same stall, consequently the mangers were different. Professor Sir F. Hobday was so interested in the specimen (of the grey) that he asked that it might be added to the museum at the Royal Veterinary College.

In my opinion, age was the cause in both cases—a molar tooth becoming loosened in its socket and allowing ingress of necrosis bacilli, the invasion of which ultimately became so extensive as to lead to ulceration, making recovery impossible.

I have learned from these cases that where an aged animal appears to have trouble arising from the teeth it may be the onset of a serious condition, and I advise accordingly.

*Case recounted in presenting a specimen at a meeting of the Sussex Veterinary Society held at Brighton, July 3rd, 1936.

The officials of the Cleveland Bay Horse Society have been approached with a view to finding Cleveland Bays to horse the King's state coach, which will be used at the Coronation. At previous coronations the state coach has always been horsed with Cleveland Bays. Owing to the heavy exports to the United States there are few suitable Cleveland Bays left in North Yorkshire. Under the circumstances it may be necessary to use half-bred Cleveland Bays.

Annotation

ACAPRIN AND PRONTOSIL IN THE CHEMOTHERAPY OF PROTOZOAL AND BACTERIAL INFECTIONS

Since Ehrlich's discovery of salvarsan, many new chemotherapeutic remedies have appeared from time to time, but it is only in the treatment of protozoal diseases that the use of specific drugs has been attended by any marked success. In bacterial infections, on the contrary, it has been otherwise and even now only the most optimistic expect much success from chemotherapy in this field. It seems as if there exists some radical difference between protozoal and bacterial infections, which prevents successful treatment of the latter by chemical means. It is true that a large number of highly efficient disinfectants have been produced which exert a marked bactericidal action when brought into direct contact with the infective organisms. The action of these substances, however, is of a purely local nature. They do not exert any specific bactericidal effect on invading organisms when introduced at remote sites as, for example, by intravenous, subcutaneous or peroral administration. In veterinary therapeutics we have, perhaps, the only clear case of a drug exerting a specific chemotherapeutic action on bacteria, *viz.*, iodine in the treatment of actinobacillosis of bovines. It is impossible to believe that, in the doses given, iodine has any direct bactericidal action on the organisms at the site of the lesions; the action, whatever it may be, is almost certainly an indirect one. In contrast to this observation, Yorke and Murgatroyd (1935) have shown that the action of trivalent arsenical and antimonial compounds in trypanosomiasis is due to a direct parasiticidal effect, those compounds which are most active *in vitro* being also most efficient in clearing the blood of parasites.

It will be recalled that Professor Hörlein, of Elberfeld, in an address (for summary, *see Vet. Rec.* (1935.) Vol. 15, p. 1305) on the subject of chemotherapy to the Royal Society of Medicine in London reported on the discovery of a new remedy, acaprin, against piroplasmosis. In the same paper, he reviewed the research work leading up to the finding of a chemotherapeutic substance active in certain streptococcal infections, a field in which hitherto all efforts at rational therapy on these lines had been unsuccessful. This substance, now known as prontosil, belongs to the azo-dye series and is remarkable for the selectivity it displays towards streptococci, yet is almost non-toxic for the host.

Enquiry into the rationale underlying the successful chemotherapy of diseases due to micro-organisms reveals that the best results have been obtained where the organisms concerned have reached a relatively high level of differentiation. Nothing is more striking than the success achieved in the chemotherapy of syphilis and trypanosomiasis in man, nothing more frankly disappointing than the administration of all manner of supposedly bactericidal substances in such conditions as streptococcus septicaemia. For this reason, then, little headway has been made in the chemotherapy of bacterial infections due to cocci and bacilli, genera which, in a biological sense, must be regarded as the least evolved of the micro-organisms. The same applies to virus diseases for, apart from neosalvarsan, which has a high reputation in the treatment of contagious equine pneumonia, no product of any specific value has been obtained.

Epizootics in animals due to trypanosomes have been relatively easily dealt with by the same drugs as have been found of value in the treatment of similar diseases in man. In this connection one recalls the treatment of nagana in cattle, and the treatment and prophylaxis of surra in horses by the administration of Bayer 205 (Hornby, 1930). On the other hand, there has been a lack of success in the treatment of those diseases of animals which are not generally related to the tropical diseases of man. The most important of these epizootics are the piroplasmoses, which are caused by Babesiidae and Theileriidae, and are found not only in tropical and subtropical regions, but also in temperate zones. Chemotherapy in these diseases has, so far, been limited by the large number of subspecies of Babesiidae, and by the fact that substances which are chemotherapeutically active against a particular organism are useless against another nearly related type, which presents a similar clinical picture. To the English protozoologists Nuttall and Hadwen (1909), and Stockman (1909) belong the credit of first introducing trypanblue as a specific in this group of diseases. This substance, however, affects relatively few of the types of piroplasmosis and its action is merely to convert an acute infection into a latent form without symptoms. Smythe (1935) instances trypanblue as having a satisfactory action against *Babesia bigemina*, but as being useless against *B. divergens*. An advance was made when Stephan and Esquibal (cited by Hörlein) introduced trypaflavine, which has been shown to have a rather wider field of therapeutic action and a more intensive effect on the individual types of causal organism. However, since it is inactive in theileriasis and as it is necessary to administer it intravenously, trypaflavine has not proved to be entirely satisfactory. The list of other substances, which have been tried from time to

time, as remedies in piroplasmosis, is a long one (Yakimoff, 1936), but none of these drugs has been found to be generally applicable. For this reason, therefore, intensive search has been prosecuted for a substance active against all types of Babesiidae and Theileriidae, and which would be relatively easily administered. In the finding of acaprin, these efforts would appear to have been successful.

Acaprin

In veterinary therapeutics, the discovery of acaprin would seem to mark an advance on anything hitherto available for the treatment of the piroplasmoses of animals. It is free from most of the disadvantages of trypanblue and trypaflavine. Its range of therapeutic action is far wider than that of either of these drugs, it being active against theileriasis (*Th. dispar* and *annulata*) as well as against most of the *Babesia* infections in horses, cattle, sheep, pigs and dogs. It can be given subcutaneously, intramuscularly or orally, and although toxic effects have been noted in a small proportion of cases, these are not of such a nature as to raise objection to its use.

The following table, compiled by Kikuth and quoted by Hörlein (1936) indicates the superior activity of acaprin as compared with trypanblue and trypaflavine:—

Species.	Host.	Action of Trypan-blue.	Action of Trypa-flavine.	Action of Acaprin
BABESIIDAE (FAMILY)				
B. canis	Dog	+	++	++
B. bigemina (Texas fever)	Cattle	+	+	++
B. argentina ...	„	(+)	+	++
B. bovis (haemoglobinuria) ...	„	++	++	++
B. divergens (British redwater) ...	„	O	*	+
B. berbera (Babesiella)	„	O	+	++
B. caballi	Horse	+	+	++
B. equi (Nuttallia)...	„	O	+	++
B. ovis (Babesiella)	Sheep	O	+	+
B. suis	Pig			+
THEILERIIDAE (FAMILY)				
Th. parva (African coastal fever) ...	Cattle	O	O	*
Th. dispar ...	„	O	O	+
Th. annulata ...	„	O	O	+
Th. mutans ...	„	O	O	O

* Action of the drug unknown.

From the point of view of the practitioner in Great Britain, the discovery of acaprin is noteworthy in that favourable reports of its use in British redwater are forthcoming. Smythe (1935), Harvey (1935) and others have already commented on the distinct value of acaprin in this condition, and although it is necessary to be rather guarded in the appraisement of a specific for a disease in which so many factors operate, it can be said that its use is attended by a markedly beneficial effect on the course of the disease. In countries where cattle are pastured under range conditions, and where piroplasmosis is enzootic, the demand is for a prophylactic rather than a remedy. No data are available for the value of acaprin in this connection, but it is to be hoped that in future investigation it will prove a practicable proposition in the process of immunisation of animals against piroplasmosis.

Prontosil

Turning to the field of bacterial infection, we find that the pessimism which has hitherto existed, has given rise to a more hopeful outlook since Domagk (1935) announced startling chemotherapeutic success in the protection of mice against lethal doses of haemolytic streptococci by the oral administration of a dye compound which he called prontosil. Other Continental workers, Levaditi and Vaisman (1935) have tested and confirmed the action of the preparation in streptococcus infections of animals. In this country, the validity of the claims for prontosil have been verified by Colebrook and Kenny (1936). These workers have been able to show that the drug has a high curative action in mice inoculated with virulent streptococci obtained from puerperal infections. In addition, a prophylactic effect could also be demonstrated. Twelve mice were inoculated with 50 m.g. of prontosil and four days later were given a dose of streptococcus culture intraperitoneally. Only two succumbed to streptococcus infection within three days, whereas nine out of twelve untreated controls were dead within that period. On the clinical side, the same authors report fully on a series of 38 cases of severe puerperal streptococcus septicaemia treated with prontosil, in which the results are carefully analysed and found distinctly favourable. Various continental workers, Schreus (1935), Scherber (1935), Gatenburg and Thimme (1935), also report remarkable success with prontosil in the treatment of erysipelas and kindred affections.

Buttle, Gray and Stephenson (1936) have also verified the action of prontosil in streptococcus infections of mice. In addition, they have succeeded in demonstrating that a nearly related substance, *p-aminobenzenesulphonamide*, has a therapeutic activity equal to that of prontosil, but is definitely less toxic when given by the mouth, so that it is possible to obtain better protection by giving larger doses.

One important feature is that all observers are agreed that the effect is limited to infections due to haemolytic streptococci. In Buttle's work, however, it was found that protection against streptococci belonging to different

serological types could be obtained, a fact which may greatly extend the clinical usefulness of this drug.

It is as yet impossible to say how these dye compounds act. It is almost certainly not due to direct bactericidal action. In the concentrations used for treatment, prontosil has little or no disinfectant action on streptococci *in vitro*. Nor it is likely, as Colebrook and Kenny have shown, "that the invasive character of the streptococcus is changed by contact with the drug or any hypothetical compound formed from it *in vivo*. It may be possible "that the cocci in the treated animals cease to elaborate certain toxic products which may be directly responsible for death, but at present we know nothing in support of it. Finally, we have to keep in mind the possibility that the drug activates the reticulo-endothelial system—or some other tissue which may play a vital, but as yet unknown, part in checking invasion by this microbe."

There is a possible wide field of application in veterinary practice for prontosil, or similar compounds, provided they can be put on the market at an economic rate. So far, their action has only been demonstrated in haemolytic streptococcus infections of man, but, since the serological type seems to be immaterial, they may well prove of value in such streptococcus infections of animals as joint ill in foals, equine pneumonia, possibly bovine mastitis, etc.

Finally, the discovery of prontosil may be but the prelude to others of a similar nature, but we must remember that, since nothing is known of the mechanism by which the drug overcomes infection, further advance is bound to be slow. A commentator in a recent issue of *The Lancet* sums up the position very aptly in these words: "In this sphere of medicine we are only groping in darkness and finding something here and there more by good fortune than by intelligent design." The symbols "205," "606" and "914" are indicative of the blind and laborious route by which chemotherapy has advanced.

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N. J. S.

Lecture Abstract

VACCINATION AGAINST SALMONELLA INFECTION*

Nomenclature and classification of the salmonellas.

Before 1934 Salmonella nomenclature was chaotic. This was clearly demonstrated at the Twelfth International Veterinary Congress held in New York in 1934, but during the discussion a statement was presented by Dr. Lovell, who pointed out the significance of classification on the ground of different antigens occurring in the salmonellas. He drew attention to the significance of the flagellar antigen "H" and the somatic antigen "O," which differentiation was made in 1917 by Weil and Felix. In 1922 Andrewes had pointed out the great variation existing in "H" antigens. In Great Britain this research was elaborated especially by Bruce White, while in Germany Kauffmann and others followed the same course. The "O" antigens of the salmonellas proved to be very different too, and as this antigen is the most important from an immunological point of view, a classification based on it is most to be recommended. In 1934 a classification based on antigenic structure was drawn up by the salmonella committee of the International Society for Microbiology and 43 species were dealt with; the number has now increased to about 50. The committee did very important work, but their classification is not quite satisfactory, at least to the pathologist, seeing that it groups together salmonellas that are wide apart as regards the diseases they cause (for example: in the C-group we find *S. typhisuis*, which causes a prevalent disease, and *S. oranienburg*, which has been found sporadically in faeces). This induced Hohn and Herrmann in 1936 to make a new classification in which chemical characters rank above serological relationship. They distinguish between the so-called culture-type and the serotype of a salmonella, which types are not related. The culture type is ascertained by its action in an

*Lecture given by Professor Dr. L. de Blieck (Director of the Institute of Parasitic and Infectious Diseases, State University of Utrecht), under the auspices of the University of London, at the Royal Veterinary College, May 28th, 1936.

optimal medium (Hottinger testicle extract) and also in a medium deficient in nutritive substances (Simmons substrate). Various sugars are added together with an indicator, bromthymol blue. Thus, with these authors the culture-type comes first for classification, serology making it complete by ascertaining the sero-type. In their opinion the differentiation and classification of the typhoid-paratyphoid group will have to be developed by further testing for culture-types. Either system is significant in its own way and supplements the other. For the classification of a new species both courses should be pursued.

Antigenic Structure.

This has been studied by agglutination and the "H" and "O" antigens have already been mentioned, the former reacting in a floccular manner, the latter in a granular.

Since 1921 (Arkwright) we distinguish between the smooth-form (S) and the rough-form (R) of salmonellas and other bacteria. The smooth-bacilli give a smooth colony-form on agar, and a regular growth in broth, and they are not spontaneously agglutinable in 0·85 per cent. salt solution. The rough-bacilli give the typical rough colony-form on agar and a granular growth in broth, with a deposit, and they are spontaneously agglutinable in 0·85 per cent. salt solution. The factors connected with this spontaneous agglutinability were studied by Bruce White.

The R-form may be regarded as an S-form which has lost the surface-antigen-O with its polysaccharide character. The R-bacilli, however, also contain polysaccharide antigens, which lie below the reactive surface of the smooth bacilli.

On the analogy of other species of bacteria the present opinion is that the O-polysaccharide plays the active part in immunisation.

In addition to the S- and R-body-antigens, others have been described in literature; for instance, the Q-antigen, which has a protein-character.

There still remains a very important antigen, the so-called Vi-antigen (virulence antigen). As early as 1920 Weil and Felix drew attention to the fact that highly virulent living typhoid-bacilli are influenced only by H- and not by O-agglutinins.

Felix and Pitt (1934) report that types of bacilli resistant to agglutination with O-serum possess the so-called Vi-antigen, against which Vi-agglutinins may be formed. Bacilli very easy to agglutinate were alleged not to possess it. With Vi-antigen-vaccine they gained very good results, when immunising mice against intraperitoneal infection with living bacilli. Vi-antigen forms most easily at 37°C. Felix (1935) describes good results in typhoid patients treated with horse-serum that contained O- and Vi-antibodies. The Vi-antibody was supposed to check the multiplication of bacteria, the O-antibody neutralising the endotoxins.

All this research work concerning antigens is of direct or indirect importance for our knowledge of the preparation of good vaccines. Of late years the preparation of immunising fractions from salmonellas has been tried in various ways. It has been found that intact protein is not essential. The immunising power of these fractions varies and runs parallel with the toxicity; fractions have even been isolated that were supposed to be more potent than the so-called whole-vaccine (Raistrick and Topley). Boivin (1935) and others showed that the substance separated by them consists of carbohydrate plus fatty acids, which were alleged to form an "antigène complet." If we consider the result of all these researches, which are undoubtedly only the first steps in the intricate domain of antigenic structure, it may be stated that for the preparation of an immunising vaccine we must start from smooth-types isolated preferably from the same species of animal we want to immunise; at any rate from a micro-organism containing the same O-antigen. To spare the O-antigen we must not heat too intensely or too long. We must search specially for types containing sufficient Vi-antigen. So long as they cannot be found, we shall have to avail ourselves of vaccines prepared from newly-isolated types (V-W-types). The Vi-antigen is spared as much as possible by refraining from the use of aether or chloroform and killing by heating at a not too high temperature; better still, by using formalin.

The preparation of vaccines.

How Far is the Control of Salmonellosis by Means of Immunisation Possible?

Little is known about curative vaccination, and the results attained are as good as negative. Therefore only preventive vaccination remains. It was first and till now most extensively performed in man; two methods are applied, namely, subcutaneous and oral vaccination. The latter was promoted by Besredka and for the last 20 years has been specially applied in France and some other countries. The principle of subcutaneous vaccination is based on setting up a general immunity. Besredka has developed the principle of "local immunity." Pathogenic micro-organisms were alleged to become active through contact with certain receptive cells, which contact was said not to come about if these cells have become immune; in that case there is a so-called "local immunity" as contrasted with general immunity.

Vaccination in practice.

Besredka's theory of local immunity has not been proved. Immunisation *per os* is not

impossible, but general immunity will also result.

Most results of the subcutaneous method known relate to typhoid-paratyphoid-vaccination, and in recent years the majority of the reports are in favour of vaccination, though some are against it.

Oral inoculation dates from the last 15 years—its data are scantier and less convincing. This too is most extensively applied to man, but experiments on animals have also been made. In 1932 vaccination *per os* against pullorum-infection in one day-old chicks was performed in the Institute for Parasitic and Infectious Diseases of the University of Utrecht by De Zeeuw; he saw good results from the subcutaneous, but not from the oral administration of old filtered broth cultures (antivirus). He also made use of heated broth cultures without filtration as a vaccine for oral vaccination; the result of this was not significant either.

We may conclude that it is always difficult to judge the data about vaccination obtained from practice. An epidemic may be declining when inoculation takes place, and under natural circumstances there are so many other factors to assert their influence that no judgment on a particular system of vaccination is possible.

Though experiments in practice are valuable, they should be attended by continual scientific control, which is probably more possible in animals than in man. Experimental vaccination and experimental infections must be our guides, but can never furnish absolutely reliable data, as natural infection is always greatly different from our imitative laboratory attempts. In order to decide whether vaccination against salmonellas will meet with success in general, orienting experiments with mice are probably to be preferred, because these animals are available in considerable numbers, and, in consequence, possible errors in stating the results are more easily corrected.

A great number of investigators have occupied themselves with the vaccination of mice against salmonellosis-infection. From the literature we may conclude:—

(*a*) An absolute immunity was not achieved, at most a heightened herd resistance, with individuals more resistant than unvaccinated controls.

(*b*) A heightened resistance has been achieved by vaccination: intrapleural, intraperitoneal, intravenous, subcutaneous and oral.

(*c*) Results have been obtained with vaccines prepared in greatly different ways (by heating cultures at 55 to 100°C. or with formalin, carbolic acid, etc.).

(*d*) There is a connection between the O-antigen and the immunity set up by the vaccine:

(*i*) Flagella are not essential.

(*ii*) There is a connection between the formation of O-agglutinins and the immunity set up.

(*e*) By infection with subminimal doses of living bacilli a heightened resistance may also be achieved.

Experiments by Van Dorssen indicated that oral vaccination yielded no positive result. For the present the subcutaneous method is to be preferred. He did not, however, obtain a favourable result with vaccination of dogs against *S. enteritidis* var. *dublin*, either by oral or by subcutaneous vaccination. In the Institute at Utrecht he observed a spontaneous *S. typhi-murium* infection with fatal termination in young cats. Vaccination *per os* had little or no favourable influence on the course of this infection, and similar vaccination of young cats did not protect them against spontaneous or experimental infection.

In collaboration with Dr. Jansen, experiments were carried out in the Utrecht Institute concerning the immunisation of silver foxes. In the Netherlands *S. enteritidis* var. *dublin* was found exclusively. Two hundred and seventy-five foxes on nine farms were subcutaneously inoculated with a 0·2 per cent. formol broth vaccine. The inoculation was repeated after a week. (No controls were included; two of the vaccinated foxes which were ill died, the remainder living). From now on control will consist in:—

(1) Hygienic measures.
(2) Blood tests, and examination of the faeces of all the breeding animals.
(3) The boiling of all animal food.
(4) A campaign against rats, mice and fleas.
(5) Control of the purchase of breeding animals.
(6) Vaccination of all the animals, especially the very young pups.

Salmonellosis in Pigeons.

In pigeons Salmonellosis occurs very frequently and is the most important disease of messenger pigeons. For the last five years the Institute at Utrecht has paid much attention to this disease, and between January 1st, 1933, and September 1st, 1935, 458 pigeons belonging to 321 owners were examined (237 dead and 221 living). These pigeons had suffered from sporadic or prevailing diseases: 55 times salmonella infection was diagnosed, once only Van Dorssen isolated *S. enteritidis* var. *dublin*; the other cases were diagnosed as *S. typhi-murium* infections.

Salmonellosis occurs in young and adult pigeons; young birds present a picture of acute enteritis and emaciation, with cerebral phenomena. With older animals sudden deaths caused by enteritis occur, but usually the course of the disease is chronic—gradual emaciation, and in most cases arthritis of the wings.

Carriers are not uncommon, and bacilli are found in the intestines, ovary, and testes; many carriers may be discovered by means of the agglutination test.

Normal pigeons have practically no salmonella agglutinins in their sera; researches by Van Dorssen have proved that even a titre of 1 : 10 should be considered suspect.

In order to know if immunisation will have practical results it is most important to learn how natural infection takes place. There are several ways in which it is possible:—

(1) By an infected egg.
(2) By contact in the nest.
(3) By infection from parent pigeons.
(4) By inhalation of dust in dirty pigeon-houses with infected faeces.
(5) By infection of young and older pigeons with bacilli from so-called carriers. Infection of food and drinking water.

In view of all these possibilities of infection the prospects of controlling the disease by immunisation are not favourable, as infection may take place at a very early age, or even in the egg.

Until now vaccination against pigeon salmonellosis has not often been put into practice. Van Dorssen vaccinated a number of pigeons *per os* with 14 day-old broth cultures, killed by heating, either with or without a previous administration of a 10 per cent. gall solution. The results showed that vaccination *per os*, whether with a previous administration of gall or not, has no influence on the course of the experimental infection; there was also an indication that vaccination shortly before the experimental infection induced a more unfavourable course of the disease.

In view of the experiments with mice, a more favourable result might have been obtained from subcutaneous vaccination, but, owing to special circumstances, this could not take place.

Salmonellosis in Other Birds.

In salmonellosis among other birds vaccination is not always advisable. It is better to control chicken-salmonellosis by finding out and killing the carriers, and taking hygienic measures with respect to chick-breeding. Vaccination against fowl-salmonellosis has been practised with varying success.

With respect to the control of *S. gallinarum* infection the only vaccination to be recommended is that of healthy fowls, to be practised with strict hygiene. On well-tended farms, however, where hygienic conditions obtain, *S. gallinarum* infection rarely occurs.

The principal salmonella infection of ducks is *S. enteritidis* infection, though *S. typhi-murium* also occurs. Duck salmonellosis resembles *S. pullorum* infection of fowls and chicks and must be controlled in the same way.

Salmonellosis in Large Animals.

Few experiments on large animals have been made. In handbooks vaccination in support of hygenic measures has been recommended for years.

Control of abortion of the horse caused by *Salmonella equi* is attempted by vaccination, but it is difficult to decide whether it is the vaccination that causes an outbreak to stop. The outbreak may suddenly come to an end on the infected farm, without recurring, and no opinion can be expressed on the actual immunising value of the vaccination. The same holds good for the vaccination of calves and pigs. A few experiments on a small scale, carried out by the writer and others, convey the impression that vaccination may contribute to the control of salmonellosis in these animals.

Paratyphoid in foals and lambs is less easily influenced by vaccination.

In view of the experience now at our disposal we need not be pessimistic regarding vaccination against salmonellosis.

Summary. The subcutaneous method is to be recommended for the present; the inoculation must be repeated two or three times, and the choice of the culture to be used and the preparation of the vaccine require a scrupulous control and more scientific research.

E. Friedberger (1919) was too gloomy when he said: "In accordance with the great eternal laws, epidemics must run their course, scarcely influenced by vaccination."

E. W. Walch (1932), who worked in the Dutch Indies, sounds a more cheerful note: "When again and again after the introduction of a universal vaccination we perceive a decrease of typhoid mortality, it is only natural to assume a causal relation between these phenomena."

In the writer's opinion this applies also to vaccination against salmonella infection.

UNIVERSITY OF LONDON

During the week beginning August 17th the Administrative Offices of London University will be removed to the new University Buildings at Bloomsbury. Persons having business with the Departments of the University are advised to ascertain beforehand at which address the Department in question is to be found.

Communications should be addressed up to August 21st to South Kensington, S.W.7.; and after that date, except in the cases noted below, to University of London, W.C.1. The postal address of the Bloomsbury offices will be University of London, W.C.1; the telegraphic address University, London; and the telephone number Museum 8000.

The University Library will not be transferred until the New Year, and communications regarding the Library and books returned by borrowers should therefore be addressed, until further notice, to the University Library, South Kensington, S.W.7. (Telephone: Kensington 7000.)

Most University examinations hitherto held at South Kensington will for the present continue to be held there.

Report

COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE

NINTH ANNUAL REPORT OF THE CHIEF VETERINARY OFFICER

The veterinary staff consists of the chief, one senior assistant and eight assistant veterinary officers, and the county is divided into eight areas each of which is administered by one of the veterinary staff. The ninth assistant is in charge of the sheep scab duties all over the county.

As heretofore, the report is divided into two main sections, the one dealing with the work under the Diseases of Animals Acts, and the second with the administration of the Milk and Dairies Acts and Orders.

There has been no case of rabies reported and only one of suspected glanders, which, however, was not confirmed.

Anthrax.—The deaths of 104 animals were reported and investigated, but only ten, namely those of one bull, two bullocks and seven cows or heifers, were found to be due to anthrax. Of these latter, three animals had been slaughtered before the disease was confirmed.

Sheep Scab.—Twenty-two new outbreaks were confirmed, against 68 the previous year and 88 in 1933-34. The disease thus shows a satisfactory diminution. It was necessary to appoint four temporary veterinary officers during the double dipping period to assist in the examination of sheep, and the two patrol shepherds in the employment of the County Council were utilised to supervise the gatherings of the sheep. A total of 177,995 sheep were submitted to an individual examination by the veterinary staff and 126,652 sheep were double dipped under supervision. These were either on farms in the controlled areas or in flocks placed under restrictions as having been directly or indirectly in contact with the disease.

Swine Fever.—There have been 61 outbreaks of swine fever confirmed in the county by the Ministry of Agriculture, whose officers deal with this disease. Fortunately, foot-and-mouth disease did not make its appearance during the year.

Tuberculosis Order, 1925.—The number of cattle found to be affected with scheduled forms of tuberculosis has increased by 50 over that of the previous year, totalling 1,188. Of these, no less than 428, or 35·9 per cent., were found to be suffering from disease of the udder or giving tuberculous milk. As showing the value of routine examination of cattle, 572 of the above number were found as the result of these inspections, of which cattle 284 had udder tuberculosis.

An interesting experiment was carried out on certain small farms in the dales when all cattle on the 15 farms concerned were tuberculin tested. The result showed an incidence of tuberculosis of 7·6 per cent. of the animals only, inclusive of the cattle on two farms which were completely free from the disease.

The veterinary officers also paid 393 visits to cattle markets and examined 3,003 specimens microscopically for tuberculosis and other conditions.

Under the section of the report dealing with Milk and Dairies we read that there were 50 complaints under Section 4 of the Milk and Dairies (Consolidation) Act, and as the result of the investigations carried out, diseased cows were traced in 35 instances, or 70 per cent. On the other hand, as the result of 111 reported infections of bulk milk samples examined by the staff of the County Medical Officer, success in tracing the culprit cows was only achieved in 35·5 per cent. of cases.

The veterinary staff paid 17,407 visits to farms on routine inspections and examined 213,933 cows or heifers thereon. Both these figures are the highest ever reached in any one year. Individual samples of milk taken by the veterinary staff are all examined microscopically by the officers who take them and those that are negative to tuberculosis and still considered suspicious are forwarded to the laboratory, which is under the County Medical Officer. Inclusive of 460 group samples, 1,440 samples were submitted to the biological test and of these 77 individual and 36 group samples were found to contain *M. tuberculosis*, or 7·86 per cent. in all. In 145 instances both guinea-pigs used for the inoculation of the milk sediment died prematurely before diagnosis could be established.

At the end of March, 1936, there were 268 licensees producing Grade "A" milk under the Accredited Producers' Scheme and the Milk (Special Designations) Order, 1936, 22 herds producing "Certified" milk and ten Grade "A" (tuberculin tested).

The report ends with a summary of the farms visited and cattle examined and numbers found to be affected with tuberculosis as defined by the Tuberculosis Order of 1925 in the 147 sanitary districts of the county.

The Attested Herds Scheme for Scotland, which has recently been revised, now provides for the payment of the penny bonus on all milk from attested herds.

VICTORIA VETERINARY BENEVOLENT FUND

MEETING OF COUNCIL

A meeting of the Council of the Victoria Veterinary Benevolent Fund was held at 10, Red Lion Square, London, W.C.1, on Thursday, June 25th, 1936, when the following members were present: Lieut.-Colonel J. W. Brittlebank (President), in the chair, Professor J. B. Buxton, Messrs. G. H. Livesey, J. W. McIntosh, A. MacKenzie, W. Nairn, Mrs. M. S. Nickinson, Lieut.-Colonel P. J. Simpson, Mr. Arnold Spicer, Major F. J. Taylor, Mr. J. Willett and Professor G. H. Wooldridge.

The minutes of the previous meeting, having been published, were taken as read and signed as correct.

Letters of apology for absence were received from Major F. L. Gooch, Mr. J. Ewing Johnston, Major C. W. Townsend, Messrs. W. Woods and W. Jackson Young.

Secretary's Report

The Secretary submitted the following report:—

New and increased subscriptions.

	£	s.	d.
David Brown		10	6
A. Brownlee	1	0	0
F. T. Harvey	1	1	0
Major T. H. Hobson (increased by 10s. 6d.)	1	1	0
W. D. Macrae		10	6
North of England Ladies Annual Effort	22	0	0
F. C. Scott (increased by £1 1s. 0d.)	2	2	0
W. Scott (increased by 10s. 6d.) ...	1	1	0
E. J. H. Sewell		10	0
Captain J. F. Taylor		10	6
	£30	6	6

Collecting Boxes		*Donations*	£	s.	d.
Central Veterinary Society	£3 0 9				
Derbyshire Division ...	1 10 0				
			4	10	9
Anonymous				16	6
"				5	0
Professor J. B. Buxton (per W. H. Wortley) ...			5	5	0
A. Fielding Clarke (per B. Best)			1	1	0
J. C. James (legacy) ...			200	0	0
Captain R. K. Kent ...				10	6
Mrs. A. McLean			1	1	0
Midland Counties V.M.A. ...			5	0	0
Pekin Palace Dog Association (per J. Willett) ...			2	2	0
E. F. Peck				10	0
South Eastern V.M.A. ...			7	7	0
Arnold Spicer			30	0	0
G. A. Tomlin			1	0	0
			£259	8	9

The report was approved and the Secretary was instructed to express the thanks of the Council to the respective donors, with special mention of the North of England Ladies' effort.

Cases

33. The Secretary reported that this recipient died on May 15th, 1936.

122. Two orphan girls. An application was received from the aunt of the two girls, who are now in an orphanage, for a special grant to cover the cost of their school outfit. A grant of £5 was made and consideration of the question of all the school outfit deferred pending the receipt of further information, the matter being left in the hands of the Executive.

176. Widow, aged 66. Ill-health. A grant of 10s. a week was made for the present quarter.

185. Daughter of member, aged 62. The grant in this case was reduced to 10s. a week.

186. Widow, aged 62. The grant of £1 made in this case was continued.

187. Daughter of member, aged 67. Only income, old age pension. The grant in this case was increased to £1 per week.

188. Widow, aged 55. Two children, one at school. No income and unable to dispose of practice. It was agreed that the grant of £1 per week be continued during the present quarter.

191. Widow, aged 60. Income about £34 per annum. The grant of 10s. per week to be continued for the present quarter.

192. Widow, aged 65. The grant of 10s. a week to be continued, but if on further enquiry the Executive Committee should consider an increased grant is necessary, the matter to be left in their hands.

193. Widow, aged 69. Further enquiries are to be made in this case.

194. Widow, aged 45. The consideration of this case was deferred pending the receipt of further information.

Investments.—The Treasurer was authorised to invest the balance in the Donations Account in a suitable security.

Livestock in Northern Ireland

New records in the production of pigs, sheep and poultry are reported by the Northern Ireland Ministry of Agriculture.

Pigs have increased by 13·5 per cent. in the past year, the number now being in excess of 520,000; and there are 834,754 sheep, an advance of 16,450.

For the first time, poultry have reached the total of 10,500,000, an increase of 13·8 per cent.

Cattle number 769,663, which, though below the 1935 return, exceeds the figure for any previous year from 1922.

Veterinary Society Report

SUSSEX VETERINARY SOCIETY*

PRESIDENT'S ADDRESS AT BRIGHTON

A meeting of the Sussex Veterinary Society was held at the Old Ship Hotel, Brighton, on Friday, July 3rd, 1936, when the following were present: The President (Mr. J. W. Pritchard) in the chair, Messrs. A. J. Alexander, L. S. Balls, P. Baird, W. P. Blount, A. D. Campbell, E. Clark, J. B. Dier, H. Scott Dunn, J. I. Edgar, E. R. Greenwood, Dr. L. Jordan (Hon. Secretary), Messrs. L. J. Kelly, C. J. R. Lawrence, F. Marks, S. Smith, Miss M. L. Somervail, Mr. H. Taylor and Captain E. H. Wyly. The following attended as visitors: Captain R. E. C. Bullen, Mr. W. K. Townson, Mr. J. E. Wallis, Mr. F. W. Willett, Mr. E. C. Winter and Mr. P. Vincent.

Obituary.—The PRESIDENT referred to the death of Professor Macqueen and called upon Mr. W. K. Townson to say a few words of appreciation.

Mr. TOWNSON, responding, observed how greatly they mourned the loss of Professor Macqueen. Many of those present were students under him and would probably know as much about him as he could tell them. As a member—as was Professor Macqueen—of the Council of the Royal College of Veterinary Surgeons, he could say that the Professor devoted an endless amount of time and trouble to his various duties. Whatever he said was worth listening to and his advice was always acceptable; in particular, that given in cases before the Registration Committee was always very helpful. He was awarded the John Henry Steel Medal in 1915 and was one of the foundation members of the Central Veterinary Society. "Professor Macqueen was always willing to give his valuable advice and by his death we have lost a most excellent teacher and one of the most eminent members of the profession," concluded Mr. Townson.

Mr. BALLS having supplemented this tribute in feeling terms, the meeting then stood in silence for a few minutes as a mark of respect.

The minutes of the inaugural meeting held on May 28th, 1936, were read and were confirmed and signed by the Chairman.

Correspondence.—The Secretary read letters received from Mr. H. W. Steele Bodger, Dr. F. Bullock, Mr. H. S. Caldwell, Mr. T. Dalling, Sir Frederick Hobday, Mr. K. Knight, Mr. H. N. Kellas, Professor J. McCunn, Dr. A. D. McEwen, Mr. J. W. McIntosh, Mr. C. Roberts and Mr. J. F. D. Tutt regretting their inability to attend the meeting and also a telegram from Mr. E. W. Garry to the same effect.

*Received for publication July 11th, 1936.

Honorary Members.—On the proposition of Mr. L. J. KELLY, seconded by the PRESIDENT, Mr. Philip Vincent was elected an Honorary Member of the Society, as was Mr. Steele Bodger, on the proposition of Mr. H. TAYLOR, seconded by Mr. H. SCOTT DUNN.

Nominations.—The following were nominated as members: Mr. F. W. Willett (proposer, the President; seconder, Dr. L. Jordan); Mr. W. K. Townson (proposer, Mr. L. S. Balls; seconder, the President); Mr. E. C. Winter (proposer, the President; seconder, Mr. L. J. Kelly).

Elections.—The following, having been duly nominated, were elected members: Messrs. A. J. Alexander, L. S. Balls, A. E. Beilby, T. Bolton, J. A. Craft, C. Crompton, S. Gourley, H. N. Kellas, Major C. J. R. Lawrence, Professor J. McCunn, Mr. R. Renfrew, Mr. C. H. Spurgeon and Miss D. Williams.

Rules.—The Rules of the Society were before the meeting for approval, and it was proposed by Mr. H. TAYLOR, seconded by Mr. J. B. DIER, that the Rules be approved and adopted.

An amendment by Mr. A. D. CAMPBELL that the words "veterinary and allied sciences" in Rule 2 be deleted and the words "all aspects of veterinary science" be substituted therefor, failed to find a seconder.

The original motion was then put to the meeting and carried.

PRESIDENTIAL ADDRESS

Mr. J. W. PRITCHARD then gave his Presidential Address, which was in the following terms:—

Presidents of Veterinary Societies generally seek material for their addresses in reviewing the position of the veterinary profession, but with your indulgence I will depart from this method and introduce my remarks under four headings.

I. *Personal.*—I am in the happy position of being fairly well known to most of you and consequently you will know how genuine is the expression of my appreciation for the honour you have done me. It is an honour to be elected President of any society, but to be the first President of such a body is unique in respect of both position and dignity. When I was approached concerning this matter my feelings were very mixed; I was acutely sensitive of the honour and in my heart I earnestly wished to accept the proud office, but in my opinion this should be filled by one having "a quick ear, a keen brain and a slow tongue," to none of which virtues do I lay claim. I felt that possibly my age and the kind feeling existing between myself and my colleagues—upon which I place such a high value—were the chief reasons which induced you to offer me the Presidency of this newly-born branch of veterinary fellowship, and that to refuse would be a churlish and ungrate-

ful way of showing my appreciation to you all. Therefore, with considerable misgivings as to my worthiness, I accepted the honour, and need I say that I shall do my utmost to justify the confidence you have put in me to guide and direct our deliberations through this first and possibly most difficult year.

II. *The Sussex Veterinary Society.*—I take this opportunity of speaking to you as a mouthpiece of this Society. The thanks of us all are due to Mr. Blount, Chief Veterinary Officer of East Sussex, as the instigator of the idea of forming such a society. Mr. Blount not only thought of it, he did something much more valuable—he actually took steps to set the scheme in motion.

Sussex is a big county which, for the purpose of local government administration, is divided into two separate counties. It is surprising how very divided in every way East Sussex has become from West Sussex. We no longer feel that we are all in one county. It is one of the primary objects of this Society to tear down this imaginary barrier and to bring veterinarians in the east into personal contact with those in the west. As far as Veterinary Societies are concerned, the County of Sussex has been served by two different bodies, the eastern part of the county by the South-Eastern Veterinary Society and the western half by the Southern Counties Veterinary Society. Neither of these societies has held meetings which were really convenient to members living in Sussex and in any case members in the two divisions of the county were being drawn away from each other rather than being brought together. We want a society which will draw all the veterinarians in Sussex. We do not wish any of them to sever their connection with other societies and we sincerely hope to work with the utmost goodwill with our neighbouring societies. I also venture to express, on your behalf, the hope that veterinarians outside Sussex will be drawn to our gatherings by the spirit of friendship which it is our earnest desire to stimulate there. Such members will be assured of a hearty welcome and we shall be the richer for their company.

Sussex is fortunate inasmuch as it harbours many eminent veterinary surgeons who have every opportunity of specialising in various branches of veterinary science. Our several large and well-to-do towns provide scope for most up-to-date canine practices and our extensive and important agricultural areas afford an opportunity for cattle practice. We have a large hunting population and this similarly must be catered for. Our meetings, therefore, should not lack either material or variety and it should not be necessary frequently to go outside our own ranks for members who will be willing to give us the benefit of their experiences.

III. *Our Profession.*—I openly and proudly declare that I consider ours a fine and noble profession and would change it for no other. Bear in mind the fact that membership of our profession is one of the few things in this world which money cannot buy. There is only one portal and it is well and truly guarded. The mere fact of having travelled the same hard road to our common goal must instal in us a feeling of fellowship.

Ours is a very responsible profession. Have you ever pondered on our responsibilities to the general public, agriculture, sport, industry and humanity? Consider for one moment how the supervision of the health and well-being of the so-called domestic animals affects the world at large.

The horse—primarily a beast of burden and in spite of this mechanical age still a most important factor in transport and other similar fields. Hunting, racing, saddle, agricultural and commercial work gives employment to numbers of workers both directly and indirectly.

Cattle provide beef and milk and all its products and the leather industry, and I leave it to you to imagine its magnitude.

Sheep—this animal supplies us with wool for our clothing and also a large proportion of our food.

The pig provides pork, bacon and ham.

Dogs and cats—not only have these animals, kept for sport and as pets, in recent years provided handsome remuneration for City veterinary practitioners, but their feeding, housing and care find work for thousands of employees.

Poultry—a hen is worth but a few shillings and yet provides part of our daily diet and is responsible for another tremendous industry, namely, egg production.

I mention all these animals because in no small measure we are responsible for their existence. Together they spell agriculture; Great Britain is proud to claim agriculture as its greatest industry, and we as a nation are pleased to consider our livestock the greatest and best in the world. So be it—where would agriculture be without the advice and unceasing toil of the veterinary profession?

IV. *Friendship and Co-operation.*—As I have previously mentioned, the primary objects of this Society are to promote these two ideals.

Fellowship—This can never be achieved unless we are brought together, and by what better method than through the medium of a society such as this?

Co-operation—Every one of you, great or small, bold or bashful, young or old, can contribute something to the general benefit of us all. We want your experiences, we want to hear of your successes and of your mistakes, in order that we may become the more efficient.

I never meet and talk with my colleagues without learning something. This interchange of friendship, experiences and opinions is the very salt of my professional life and although you may not all be brave enough to say so, I venture to think that most of you feel the same.

I therefore do most earnestly request you to do something, no matter how small it may seem, in the way of presenting papers, relating and discussing cases or producing interesting specimens. By doing so you are lightening the difficult task of our esteemed Honorary Secretary, Dr. Leslie Jordan, who I declare to be the embodiment of energy and who is heart and soul for the interest and well-being of this Society.

And so, on this note of appeal, I close my first public address to a meeting of this kind and as my excuse I offer to you the fact that to-day I am deeply moved by the position in which I find myself.

At the conclusion of his Address from the Chair the President was accorded a hearty vote of thanks, on the call of Mr. H. Taylor.

Clinical Cases and Demonstrations

Clinical cases and demonstrations were given by the following, a lively discussion following each contribution: Mr. J. W. Pritchard, Mr. H. Scott Dunn, Mr. L. J. Kelly and Mr. W. P. Blount.

Mr. Pritchard's contribution was the description of a case of ulcerative necrosis of the superior maxilla in a hackney mare. [This case report is transferred to the Clinical Section of the present issue.—*Editor.*]

Mr. Dunn demonstrated the use of the "Euthanator"—an electrical instrument which he had found very useful for the destruction of small animals, particularly dogs. Stating that this apparatus operated on A.C. mains only, Mr. Dunn said that the method employed was to soak the temples in a saline solution and fix the harness over the animal's head. The two sponges attached to the harness and making contact with the head are also soaked. Immediately the current was switched on the animal went down unconscious. Prussic acid was then immediately injected into the chest cavity. In reply to Dr. Jordan, Mr. Dunn stated that the instrument could also be used for cats if a smaller harness was fitted; a better method for the destruction of cats, however, was the administration of nembutal. The use of the euthanator did away with the involuntary sickness and passage of urine and faeces which usually accompanied the giving of HCN. It should be remembered that the HCN should never be given by mouth as the animal was unable to swallow; consequently it should always be injected into the chest cavity.

Mr. Dunn also exhibited a number of X-ray photographs which showed:—

(*a*) A valuable greyhound which had gone lame owing to the presence of a loose body. An operation was contemplated for its removal.

(*b*) Three photographs showing bitches in various stages of pregnancy.

(*c*) Several photographs revealing the presence of pebbles which had been swallowed by dogs.

(*d*) One photograph of a dog which had swallowed a foreign body. The dog had been vomiting for a fortnight. Operation was performed and a piece of metal removed. The dog was sent home and the following day developed jaundice. Calomel was administered but proved of no use. A dose of Epsom salts was given and the dog recovered.

Mr. L. S. Balls stated that in the treatment of jaundice it was his practice to give quarter-grain doses of calomel every four hours, but he found that very few cases pulled round.

Dr. L. Jordan said that he had known several cases of whole litters of puppies being wiped out with jaundice and he had tried to associate its spread with rats. He had had good results with leptospiral vaccine.

Mr. Scott Dunn stated that he had very good results with serum. Jaundice in puppies was very often associated with worms and he considered that puppies should be wormed early, commencing at five weeks.

Mr. W. P. Blount referred to the blood test for jaundice, which showed whether it was of the blockage type or the breaking-down type. Leptospiral vaccine was only useful if the condition was of the latter type.

Sexing of Day-old Chicks

Mr. W. P. Blount, who demonstrated the above procedure, said that until a few years ago it was impossible to distinguish the sex until the birds were about three weeks old, except where two different breeds had been mated, when the sex-linkage system could be used. This system established that the female birds took on the colour of the male parent and *vice versa*, but this method could only be applied to pure breeds. Mr. Blount said that in 1927 the Japanese discovered that in the cloaca there was present a little genital eminence in all male chicks and in some female chicks. If this was prominent, the chick was probably a male, and if it was very small or absent it was probably a female chick. The Japanese could sex 11,000 chicks in a day with 95 per cent. accuracy.

Mr. F. W. Willett stated that whilst in Australia he had seen this method used and it

was possible for an expert to earn at least £10 a day sexing chicks.

Mr. Blount, in reply to questions, observed that the accuracy of the method diminishes as the chick gets older. He also said that the easiest breed to sex were Wyandottes, but that no difficulty was really experienced in sexing coloured birds.

. . . . .

Mr. L. J. Kelly gave a talk upon impressions and theories he had gained during his career. He emphasised the importance of ext. nucis vom. liq. in the treatment of impaction of the rumen in cattle and similarly the beneficial results which followed the use of chlorodyne in cases of purgation in the horse. He stated, further, that he considered calomel an unsuitable drug to administer to dogs as it always appeared to act as an emetic. Following reference to hysteria in dogs, Mr. Kelly stated that, in cases of nasal haemorrhage in horses, he regarded adrenalin as overrated; in fact, by reason of its blood pressure raising principle it might, indeed, be contra-indicated. In his opinion, calcium lactate and exercise were of greater therapeutic value. He gave it as his opinion that in cases of contagious gastro-enteritis of cats or "cat influenza," the cat flea was probably the agent responsible for the transmission of the disease. Finally, Mr. Kelly urged the adoption of palliative measures in order that nature might be given a chance.

The various points raised by Mr. Kelly were discussed by the following: Mr. E. C. Winter, Dr. L. Jordan, Mr. J. W. Pritchard, Mr. S. Smith, Mr. A. D. Campbell, Mr. W. P. Blount, Mr. J. B. Dier, Captain E. H. Wyly and Mr. H. Scott Dunn. Particular interest was shown in the administration of strychnine in connection with impaction of the rumen and in the various possible causes and treatment of hysteria in dogs.

A vote of thanks to these members for their contributions was passed and the meeting then adjourned for tea.

L. Jordan, *Hon. Secretary.*

Soya beans have received so much publicity in recent years that many pig feeders have been induced to try meal prepared from the beans; but though these beans have a remarkably high feeding value, they have often given disappointing results. When simply ground, soya beans are too fatty and cause biliousness and increase the danger of soft fat. What is called extracted soya bean meal has some of the fat oil removed and is much better suited to a pig's digestive powers. Even so, when mixed with an ordinary blend of cereals, it still fails to bring on young pigs quickly. The simple explanation is that while the extracted soya bean meal supplies protein, it fails to provide minerals such as lime, phosphorus, salts of iron, copper, chlorine, iodine and other elements now known to be needed for growth and good health.—*Scottish Farmer.*

ROYAL COLLEGE OF VETERINARY SURGEONS

Membership Examinations, July, 1936

LIST OF SUCCESSFUL CANDIDATES

(*Continued from page* 956.)

Dublin

FIVE YEARS' COURSE.

First Examination.

Bassett, B. D. (C)	O'Leary, C.
Burkhardt, J.	Power, W. P.
Greenhalgh, E. H. (C)	Sheehan, Miss R. (B)
Hutch, S.	†Sloan, W. J.
McCormack, H. J.	Treanor, G. A. (B)
O'Hagan, A. (C)	

† Denotes First Class Honours.
(C) Denotes credit in Chemistry.
(B) Denotes credit in Biology.

Second Examination.

Alley, J. C.	*Hart, B. H.
*Collery, L.	*Jones, J.
Cosgrove, J. S. (A/M)	Markham, T. F.
Fresby, M. (A/M)	Nagle, J. J.
Gallagher, M. A.	Sinnott, P. P. (A/M)
Harnett, W.	

* Denotes Second Class Honours.
(A/M) Denotes credit in Animal Management.

Third Examination.

Cotton, J. D.	Kelly, B. J.
Green, S. (A)	Martin, W. B. (P) (A)

(P) Denotes credit in Pharmacology, etc.
(A) Denotes credit in Anatomy.

Fourth Examination.

Barry, J. T.	Hayes, P.
Hart, F. S.	McAteer, J.

FOUR YEARS' COURSE.

Class C

Dodd, D. O.	Douglas, W. M.

Class D

Doherty, D. A.	Powell, R. J.
Harris, A. S.	Smith, A. M.
Jahn, Miss M.	Sweetman, L.
O'Brien, F. N.	White, John

(*Concluded.*)

VITAMIN P: FLAVONOLS AS VITAMINS

A new vitamin, "P," which cures pathological permeability of the walls of capillaries to plasma protein, is reported by St. Rusznyak and Professor A. Szent-Györgyi in a letter to *Nature* of July 4th. In the writers' experience ascorbic acid is ineffective, while the condition can readily be cured by the administration of extracts of Hungarian red pepper ("vitapric") or lemon juice. The extracts were fractionated. The active substance was found in the end in a fraction consisting of practically pure flavon or flavonol glycoside. 40 mgm. of this fraction given daily intravenously to man restored in a fortnight regularly the normal capillary resistance. Spontaneous bleeding ceased, the capillary walls lost their fragility towards pressure differences and no more plasma protein left the vascular system on increased venous pressure.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

August 10th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, 4 p.m.

August 22nd.—Entries for Jubilee Memorial Bursary Examination.

Sept. 14th-18th.—N.V.M.A. Annual Congress, Scarborough.

Sept. 21st, 22nd.—Jubilee Memorial Bursary Examination.

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PERSONAL

Appointment.—Mr. C. A. McGaughey, M.Sc., D.V.S.M., (Manchester), M.R.C.V.S., has been appointed Lecturer in Veterinary Bacteriology at the University of Manchester.

Birth.—Davison. At Calthorpe Nursing Home, Edgbaston, Birmingham, to Christine, wife of W. S. Davison, M.R.C.V.S., D.V.S.M., a son, on August 1st, 1936.

Teachers of London University.—At a meeting of the Senate of the University of London held on July 10th, Dr. James McCunn was recognised as a Teacher of Veterinary Anatomy at the Royal Veterinary College (assigned to the Faculty of Science), and Professor William Christopher Miller as a Teacher of Veterinary Hygiene at the Royal Veterinary College (assigned to the Faculty of Science).

Will.—Mr. James Macqueen, of Camden Town, N.W., formerly Dean and Professor of Surgery at the Royal Veterinary College, who died on June 23rd, aged 83, left estate of the gross value of £23,400, with net personalty £19,082. He left £100 to the Victoria Veterinary Benevolent Fund.

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VICTORIA VETERINARY BENEVOLENT FUND

The Secretary begs to acknowledge receipt of donations in memory of Professor Macqueen from the following:—

	£	s.	d.
Governors and Staff of the Royal Veterinary College	1	1	0
Sir Frederick Hobday	1	1	0

Total received, £22 14s. 6d.

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N.V.M.A. CONGRESS AT SCARBOROUGH

The V.V.B.F. (Simpson and Dunkin) Golf Trophies

It has been found necessary to alter the date of these competitions. They will be played on Thursday, September 17th, instead of Wednesday, September 16th, as announced in our issue of July 11th.

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R.C.V.S. OBITUARY

Parr, George, 151, Alexandra Road, Parkstone, Dorset, late of Salisbury. Graduated Edinburgh, December 17th, 1888; died July 25th, 1936, aged 72 years.

GENERAL OBITUARY

Lieut.-Colonel Knowles

In the death of Lieut.-Colonel Robert Knowles, C.I.E., of the Calcutta School of Tropical Medicine and Hygiene, at the early age of 53, the scientific world has to mourn the loss of one who, says *The Times*, "left a permanent memorial of his zeal in many valuable contributions to research in malaria, dysentery, snake-bite, kala-azar, rat-bite, and other tropical affections, as many contributions to medical journals and his published monographs attest."

"Robert Knowles entered the Indian Medical Service early in 1908, and was Civil Surgeon at Jhansi. He welcomed in 1912 the opportunity to go to the Indian Pasteur Institute at Kasauli as Deputy Director. He accompanied the Expeditionary Force in the closing months of 1914 to Basra, and shared in its trials and privations, for it was inadequately provided with medical and other requirements. He returned to India in 1916 to take the Directorship at Kasauli. But in 1920, after Sir Leonard Rogers had succeeded in creating the Calcutta School of Tropical Medicine and Hygiene, Knowles went there as Organising Secretary, and soon after was appointed to the Chair of Protozoology. For a time (1922-28) he combined with these labours the assistant editorship of the *Indian Medical Gazette*. But his heart was in research work, and he inspired his pupils with something of his own enthusiasm. In the past four years much of his time had been taken up with the Malaria Transmission Inquiry, which was assisted by the Indian Research Fund. He was made a C.I.E. last year, and officiated as Director of the School. He was superintendent and senior physician of the associated Carmichael Hospital for Tropical Diseases."

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LEGAL NOTES

Linseed Cake Case: Failure of Allegations of Lamb Poisoning by Prussic Acid

The allegation that 40 lambs had died as a result of prussic acid poisoning caused by eating linseed cake was the basis of an action which came before Judge Rowlands at Eye County Court on July 21st, when John Holt Wilson, farmer, of Hinderclay Hall Farm, Botesdale, claimed £100 damages from the suppliers of the cake, A. Savill and Co., Ltd., corn merchants, of Mellis and Eye.

Plaintiff's case was that there had been a breach of warranty in that the cake was unfit for stock feeding, or alternatively that defendants had been guilty of negligence. The defence admitted sale of the cake under an implied warranty, but denied that there was any breach of it.

Mr. Thomas Wilson appeared for the plaintiff and Mr. Edgar Dale was instructed for the defence.

Plaintiff said he bought 300 lambs for £585 from Mr. Herbert Kemp, of Elmswell, at the end of July last year. He fed them on a ration of 1 lb. of concentrated food consisting of 8 oz. of Kositos, 4 oz. of cotton cake and 4 oz. of linseed cake. They progressed well until August 9th, when, after rain during the night, he found three dead and others looking sickly. During that day and the next he lost 27 sheep.

There were similar cases of sickness and death on August 30th and 31st and on October 6th and 7th. After each attack the food had been changed, but the trouble began again immediately after concentrated food containing linseed cake was reverted to. Altogether he lost 40 lambs.

After the third attack, on October 6th and 7th, during which eight sheep died, he sent a sample of the linseed cake to Mr. Lincolne Sutton for analysis.

Evidence having been given by Percy Moore, a shepherd in Mr. Wilson's employ, and Mr. Herbert Kemp, the vendor of the lambs, Mr. W. F. Loveless, M.R.C.V.S., of Diss, who examined some of the dead sheep after the first and third attacks, said that, in his opinion, prussic acid poisoning was the cause. The amount of prussic acid, he added, was not as important as the rapidity with which it was given off.

Mr. M. H. Glyn, M.R.C.V.S., of Bungay, who examined some of the dead sheep after the second attack, endorsed Mr. Loveless's opinion that this was the cause of the deaths.

Mr. William Lincolne Sutton, of Norwich, who is analyst to various public bodies, said that his report that "this is pure linseed cake, but it gives a very strong yield of prussic acid when made into a mash and time given for cyanogenetic glucoside and enzyme to act. I should say it is a highly dangerous cake for feeding stock, especially young animals," was made following an analysis of the linseed cake sent to him by the plaintiff.

Questioned by Mr. Thomas Wilson, he said that this particular linseed cake was not normal in the rapidity with which it gave off the prussic acid gas. It seemed to rush off almost, and he had actually been able to smell it.

Mr. Dale: It is your view that linseed cake is a dangerous food for young stock?—Yes; there is always a danger lurking in it. It is a danger that is well known.

Continuing, Mr. Lincolne Sutton agreed that the Ministry of Agriculture recommended this form of food as one of the best for young stock and that hundreds and thousands of tons of it were sold each year throughout the country. The sample sent him yielded one to two grains of prussic acid a pound, and though this was not abnormal he considered it was a dangerous amount when given off with the rapidity with which it was in this case.

Mr. Dale: If this is such a peculiar type of cake that it gives off prussic acid gas with such rapidity you would expect the sheep to die with extreme rapidity, but we hear that some of these lingered on for several days?—The more you study these cases the more freakish the process of the poison becomes.

It was, Mr. Lincolne Sutton added, only in certain circumstances that the danger in linseed cake became real.

Mr. Dale: You think that farmers who use linseed cake are playing with fire?—Those who use it for young stock are.

At this stage his Honour asked Mr. Thomas Wilson if he was not in rather a difficulty. "You have Mr. Lincolne Sutton's evidence that it is difficult to differentiate this linseed cake from other linseed cake which is sold and which is merchantable," he said, "and there is no guarantee that the use of it in all circumstances is not dangerous."

Mr. Wilson submitted that there was no warning by the sellers of the linseed cake that it was dangerous and that it should not be fed to young stock. Secondly, if the sheep had not been killed by prussic acid poisoning, their deaths must have been a most amazing coincidence.

His Honour said that these animals had been eating damp fodder and then they had eaten concentrated food. The cause of the deaths might be in that. "Either I have to find that there has been a breach of the warranty or that defendants have been guilty of negligence in not warning the farmer that he must not feed his cake to the stock immediately after they have been eating wet clover," he said.

Mr. Wilson submitted that this linseed cake was not like ordinary cake, for it gave off prussic acid gas with much greater rapidity. "We have the extraordinary coincidence that on three separate occasions the sheep were taken ill and some died shortly after eating this food and when they had previously been eating wet herbage of some kind, while every time they were taken off this food there were no more deaths," he added.

Dr. Bernard Dyer, the well-known agricultural and public analyst, said that he had analysed a sample of the linseed cake in question for the defendants. It did not differ from any average sample of linseed cake sold throughout the country.

Answering Mr. Wilson, he said it was well known that linseed cake always had the potentiality of giving off prussic acid, and there were cases where this had produced poisoning. If the water were not properly hot when linseed cake was made into gruel for calves, it sometimes happened that it immediately began to evolve its potential prussic acid, but if boiling water were used the enzyme which liberated the prussic acid was killed and nothing happened, so that the calves thrived. The only case he had had of lambs poisoned by prussic acid had been one in which the linseed cake had been thoroughly wet in the trough during a thunderstorm, and then left in the hot sun. There was nothing in the linseed cake which he examined to render it unfit for use in feeding sheep. He thought there was a potential danger in the use of linseed cake with sugar beet tops.

Professor William Christopher Miller, of the Royal Veterinary College, said that in his opinion there had been nothing in the evidence to indicate any unusual feature in the cake concerned or to differentiate the product from the many tons sold throughout the country each year. If a beast were poisoned by prussic acid death occurred in less than two or three minutes, and if it were able to recover at all it did so within 20 or 30 minutes, and would then show no trace of the poisoning.

Summing up, his Honour said that the action had been brought to recover damages for alleged breach of warranty on the sale of a quantity of linseed cake by the defendant to the plaintiff; alternatively, for negligence. He thought that if the plaintiff were to succeed at all in this case he must succeed on the ground that there had been a breach of warranty. The plaintiff said there was a warranty implied that the linseed cake was reasonably fit for the purpose for which it was bought—in this case for feeding stock—and in the alternative plea, that there was an implied warranty that it was of merchantable quality. What was alleged in the particulars of claim was that there was a breach because the feed was defective and/or dangerous inasmuch as it liberated a large quantity of prussic acid when made into a mash and/or when coming into contact with moisture. No real evidence of negligence had been offered in the case at all. The plaintiff had called an eminent analyst, Mr. Lincolne Sutton, and it turned out that Mr. Lincolne Sutton had a sample submitted to him in October. He, at the moment, apparently did not make an exhaustive analysis, but he made an analysis and a report the same day, in which he said: "This is a pure linseed cake, free from castor bean or wheat seeds, but it gives a very strong yield of prussic acid when

made into a mash and time given for cyanogenetic glucoside and enzyme to act. I should say it is a highly dangerous cake for stock, especially for young animals." Reading that report, one would think that Mr. Lincolne Sutton was criticising the amount of prussic acid produced from that cake. Up to that moment there had been two highly-qualified veterinary surgeons considering the matter, Mr. Loveless and Mr. Glyn, and both were puzzled as to what had caused the deaths of the sheep, and as soon as they had the report of Mr. Lincolne Sutton placed before them they were quite prepared to accept what he found. That was the basis of the action.

In June of this year Mr. Lincolne Sutton was asked for further details of his analysis, and wrote that he found prussic acid was present in the proportion of 1·24 grains per lb., which he considered a dangerous amount. In the witness-box he was constrained to admit that really there was nothing abnormal about this linseed cake as regarded prussic acid—he had said that one or two grains to the pound was by no means unusual, and that this was a normal piece of linseed cake. On the face of that admission by him one would at once say: How can you say that there has been any breach of warranty where it contains the same proportion as other linseed cake sold during the year? In the witness-box, Mr. Lincolne Sutton had said it was not the amount of prussic acid in the linseed cake that was the danger, but the rapidity with which the prussic acid gas was generated. He had previously said that his impression was that it was rather more rapid than usual. It was a pity that Mr. Lincolne Sutton did not give any further indication of this, either in his report or in his letter to his solicitor in June. In view of the evidence that had been given for the defendants, his Honour said he thought he must find that he was not satisfied at all that there had been any breach of warranty.

"I am not satisfied on the evidence that this linseed cake was not reasonably fit for the purpose for which it was bought, namely, for feeding cattle and sheep," his Honour said, adding that there would be judgment for the defendants, with costs.

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Professional Treatment of a Pekingese.—A pet Pekingese dog, named Tulu, stated now to be dead, was the subject of a claim and counter-claim heard by Judge Whitmore Richards at the Birkenhead County Court on July 28th, when Mr. Warwick Fowle, M.R.C.V.S., veterinary surgeon, of Oxton-road, Birkenhead, claimed money due for professional services rendered, and defendant, Mr. George Gaunt, of Hillside-road, Wallasey, counter-claimed for £7 11s. as the value of the dog and cost of extra treatment.

Mr. H. A. Forrest, for the plaintifl, said that Mr. Fowle was in practice for 43 years prior to retiring in December, 1933, and throughout that time had borne the highest reputation. He was claiming for services rendered between June 10th and December 29th, 1933. Defendant denied that the services were rendered and alternatively said that the dog was neglected and, as a result, had to be further treated and eventually died. The Pekingese was owned by defendant's wife and was first seen by Mr. Fowle in 1929, since when up to the end of 1933 it was regularly in and out of his Wallasey surgery. In Mr. Fowle's opinion it was never a healthy dog. From 1930, an assistant, Mr. Herratt, looked after the Wallasey branch. Mr. Fowle saw the dog three times, early in 1931 when it was in the "infirmary" for treatment to an abscess, again the same year for necrosis of the jaw, and from August 31st to September 16th when it was boarded. Apparently it was during that period that defendant alleged the dog was neglected.

"It may seem that the amounts involved are small, but that is no measure of the importance of this case. It is important in that a serious allegation has been made against the plaintiff's reputation," added Mr. Forrest.

Mr. Fowle, in evidence, said he resented the suggestion very strongly. He denied neglecting the dog, which, he stated, was never particularly healthy.

Mr. Forrest: Assuming the dog had been neglected could it have contracted this disease and cataract of the eye in the 16 days it was boarded?—No.

Mr. William Woods, M.Sc., F.R.C.V.S., for 30 years a lecturer at Manchester University, said a cataract usually followed periodic ophthalmia and necrosis of the jaw followed abscess on the tooth. Neglect for 16 days could never have produced such a condition in a dog. "These pet dogs are pampered, overfed, and have no exercise," he added, "and are old dogs long before their time."

Mr. John Herratt, M.R.C.V.S., said the Pekingese was never allowed to play with his bulldog while at the Wallasey branch.

Mr. Gaunt told the Judge that in August, 1933, the dog left the house healthy and in high spirits, and when brought back it was in an emaciated condition. Its eyes were bleeding and matter was running from them.

His wife said the dog's eye was torn, and when she told Mr. Herratt she was dissatisfied with the treatment it had received, he told her the dog had been enjoying itself playing with the bull-dog. He promised to send drops, but did not. Subsequently the dog was attended by another veterinary surgeon but its condition gradually grew worse, and it was destroyed this year.

Mr. Fowle, who placed the organisation and conduct of his case in the hands of the Veterinary Benevolent and Mutual Defence Society, was awarded £2 3s. with costs, and the counter-claim was dismissed with costs.

His Honour said he could not overlook the expert evidence, and he thought everything was done to an ill-conditioned dog which was never very healthy.

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Anthrax Order Contravention.—In Cupar Sheriff Court, on July 21st, an assistant byreman admitted having cut, without lawful authority, the skin of the carcase of a cow affected with anthrax and caused an effusion of blood, but said he did not know that the animal had anthrax as he had never seen a case of anthrax before.

The Fiscal stated that accused, when charged, said that something had happened to the cow, and he thought it was a pity to lose the carcase. Stock owners, continued the Fiscal, were warned that on no account must they cut the skin of animals suspected of anthrax. The blood contained the germ, and that might be dangerous to human life.

That particular animal appeared to have had a cold and had difficulty in breathing. Certain treatment had been administered by accused, on the instruction of his master, but there had been no apparent recovery.

Sheriff Dudley Stuart, accepting defendant's statement that he had no reason to suspect anthrax, admonished him.

BRITISH MEDICAL ASSOCIATION MEETING

Summaries of Proceedings of the Scientific Sections

(*Continued from page* 959.)

Scope of Teaching and Research in Anatomy

Professor W. E. Le Gros Clark (Oxford), the President of the Section of Anatomy and chairman of the meeting, opened the proceedings with a discussion of the scope of teaching and research in anatomy. Anatomy, he said, was the science of form and structure, and its scope was the investigation not only of structure as revealed by direct observation, but also of all factors which might be concerned in the development and maintenance of the parts of the body. The experimental method was essential in the elucidation of anatomical problems, but though its development was partly stimulated by early anatomical workers in this country, it was for a long period discarded by English anatomists as a weapon of research. Experimental techniques in the hands of physiologists had provided a rich harvest of anatomical as well as of physiological facts, and anatomists in consequence had to thank physiologists for much of their fundamental anatomical knowledge of the nervous system. The traditional bias against using the experimental method in anatomy had been breaking down in recent years, and English anatomy might now look forward to a phase of development no less full of promise than that which had been realised with the method of American anatomists. Professor Le Gros Clark pleaded for the simplification of the teaching of anatomy by relieving the student of the necessity of memorising details of topographical anatomy that were of little practical importance. He also pressed for recognition of the fact that the rightful place of histology was within the field of anatomy, and he pointed out the value of a "functional" outlook in morphological teaching.

Tuberculosis in Childhood and its Prophylaxis

In the Section of Pathology and Bacteriology a discussion on tuberculosis in infancy and childhood, with special reference to its prevention, was opened by Dr. J. W. S. Blacklock who said that in an investigation of 434 cases with tuberculous lesions out of a series of 3,000 necropsies, he had found that the incidence was exceptionally low in the first three months of life, but thereafter gradually rose to a peak in the third year. He did not feel that the *post-mortem* index of infection was a true one in the higher age groups. To ascertain the incidence of infection in another way a series of Mantoux tests were carried out in nearly 2,000 children. These showed that in the first three years the percentage of positive reactions was below that of tuberculous lesions found at necropsy. The incidence of positive tuberculin reactions and positive *post-mortem* findings was much the same for the three to six year group, and thereafter the percentage of positive tuberculin tests rose to almost double that of the positive necropsy findings. This suggested a higher level of mortality during the first three years, followed by a resistance increasing with age.

Dr. Blacklock observed that in late childhood minimal infections might result in some degree of immunity. He was not in favour of indiscriminate application of B C G vaccine to the child poulation. On the other hand, the possibility of producing immunity with killed cultures should be considered. The tubercle bacilli gained access to the body through the respiratory tract in 65·2 per cent. of cases, and through the alimentary tract in 34·3 per cent. Of the cases of primary alimentary tuberculosis the portal of entry was the bowel in 32 per cent. and the pharynx in 2 per cent. Intestinal tuberculosis ulcers with caseous mesenteric glands were found in 24 of the 140 abdominal cases, and in the remaining 116 no ulcers were observed but the mesenteric glands were tuberculous.

There was a higher incidence of tuberculosis in girls than in boys, and this might be due to the fact that in working-class homes they were more domesticated, and thus more frequently exposed to any familial infection. Prevention of alimentary infection depended on the milk being free from tubercle bacilli. Unfortunately infection with bovine bacillus accounted for a small proportion of the total tuberculosis mortality. The higher incidence of bovine infection in rural districts suggested a greater contamination of country than of town milk, and might be reduced by efficient pasteurisation. The majority of infants were infected from adults with whom they were closely associated. The prevention of this continuous exposure was one of the most important measures in the control of infantile tuberculosis, and could only be brought about by isolating the infant from familial infection.

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INTERNATIONAL CONGRESS FOR MICROBIOLOGY

The scientific meetings of this Congress were actively continued during the last week at University College, London, the discussions in the eight sections being on the lines mentioned in our issue of July 11th. Each member was supplied with a volume containing some 400 abstracts of communications to be presented, and it is proposed to issue later a book of Final Proceedings, in which much of the scientific discussions will be available in précis form. The Congress was acknowledged to have achieved a great success and at least 1,000 members attended from many countries. The general level of the discussions was high, while some progress was achieved by the Committee entrusted with the task of introducing order into the nomenclature of bacteria. On the lighter side, members of the Congress and their friends appreciated the kindness of Gaumont British Limited, who arranged a special display of the film, "The Story of Louis Pasteur." At the concluding session it was announced that the next Congress would be held in the U.S.A. in 1939.

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WORLD POULTRY CONGRESS

British Exhibits at Leipzig

The sixth World Poultry Congress, which was opened at Leipzig on July 24th, came to an end on the 31st. Forty-two countries were represented at the Congress, including Great Britain, the Irish Free State, Australia, Canada, Ceylon, India, Malta, and South Africa.

The British stand was designed to illustrate the organisation of poultry breeding and the development which has been made in the direction of specialisation, and the application of agricultural education and research to this category of livestock. Among the several sections were those dealing with the organisation of the poultry industry, laying trials, breeds and breeding, hatcheries, and commercial egg production. In the breeds and breeding section, for instance, were shown examples of the hatching eggs which are sent to British farms, and the sex-linked

crosses employed for the production of layers and table chickens suitable for the commercial conditions of the country.

Other interesting exhibits were one by the Harper Adams Agricultural College showing the work done by the College and the organisation of conferences and national economic surveys; one showing the courses in poultry education provided by the National Poultry Institute, Newport, Shropshire; and exhibits of the small animal breeding research station at Cambridge, the Southern table poultry breeding station at Wye College, Kent, and the poultry nutrition centre at the School of Agriculture, Cambridge University.

The British contribution to the exhibition has been financed by the national committee aided by a grant from the Ministry of Agriculture.

Among the many interesting papers read were those on "Breeding experiments with rexfurred rabbits," by Mr. W. King Wilson, of the Harper Adams College, and "Autosexlinkage in theory and practice," by Mr. Michael Pease, of Cambridge. Addresses by Professor Halnan, of Cambridge, on "The role of minerals in poultry nutrition" and by Professor Hammond on "Pregnancy of the rabbit" received attentive hearings.

The next World Congress in 1939 is to be held in the United States of America.—*The Times.*

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CANCER RESEARCH

Mr. J. A. Giles, chief Home Office inspector, in his report accompanying the annual return of vivisection licences, says that 31 holders of special Home Office licences conducted 29,835 experiments on living animals last year in the course of cancer investigations. Of this number, 750 experiments were performed with anaesthetics and 29,085—almost entirely inoculations into mice or exposure of animals to radiations—without.

The total number of experiments performed during the year was 736,716—39,280 more than in 1934. Experiments carried out with anaesthetics were 34,437, and without anaesthetics 702,279. The number of persons holding licences was 1,857, and 17 new places were registered for making experiments, while the registration of six places was withdrawn.

"In no case," it is stated, "has a certificate dispensing entirely with the use of anaesthetics been allowed for an operative procedure more severe than subcutaneous venesection. Serious operations are always required to be performed under an anaesthetic."

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ANTHRAX AND BONE MEAL

"Bone meal, with which a pasture had been dressed, is believed to be responsible for an outbreak of anthrax in the Kenton area of Newcastle," says the *Newcastle Evening Chronicle*. "The field was utilised as pasture for 'dry' cows and a horse, the dairy cows being in other fields some distance away.

"One of the cows died suddenly and, a blood smear test having revealed the presence of anthrax bacilli, the carcase buried on the spot in quick lime. Three days afterwards the horse died suddenly. Anthrax was determined and the carcase buried. The remaining five cows were isolated in another field and, since they all appear healthy, it is believed that the outbreak has been conquered.

"In his report the Veterinary Officer intimated that inquiry elicited that the field has been manured with bone meal in December last, which is suspected as the origin of the outbreak."

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SHEEP SLAUGHTERING AT BIRMINGHAM

Birmingham Corporation Markets Committee reports that by Section I of the Slaughter of Animals Act, 1933, it is provided that every animal slaughtered in a slaughterhouse or knacker's yard shall be instantaneously slaughtered or shall by stunning be instantaneously rendered insensible to pain until death supervenes, and such slaughtering or stunning is to be effected by means of a mechanically operated instrument. This Section, however, does not apply to sheep, ewes, wethers, rams and lambs, unless the local authority passes a resolution applying the same to all or any of such animals, nor to any animals slaughtered without the infliction of unnecessary suffering by the Jewish method or by the Mohammedan method.

Since the passing of the Act its Committee has from time to time had under consideration the question of the application of the Section to sheep, and has conferred with the Trade Associations upon the matter. The Committee's representatives have also visited other towns in this country and on the Continent, in order to study the methods in operation.

It was found that in the majority of cases sheep are stunned before slaughter, although the means of doing so differ.

Objection is made by some of the members of the trade to the use of the captive bolt pistol, as it is contended that the head of the animal is more or less spoiled for sale.

Since the passing of the Act improvements have been effected in electrical stunning instruments, and the Committee has witnessed demonstrations of their use at the City abattoir. In every case there was effective stunning, and no ill-effects were found in the carcases on *post-mortem* examination.

The Committee would point out that where direct electrical current only is available the expense of installing electrical instruments is greater than where alternating current is provided. The gradual change over from direct to alternating current, however, is now being effected by the Electric Supply Department.

The Committee, after fully considering the matter, is of opinion that the Act should be made applicable to sheep, etc., but that, for the above-mentioned reason, and in order to give the trade (which is willing to co-operate) ample time to make the necessary arrangements, its operation should be deferred for a year. It accordingly recommends that Section I of the Slaughter of Animals Act, 1933, shall, on and from August 1st, 1937, apply to sheep, ewes, wethers, rams and lambs.—*Meat Trades Journal.*

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DOGS THAT ARE MORE THAN JUST DOGS

Under the above heading, Miss Mary T. Melling, of Edinburgh, owner of one of the guide dogs, writes:—

"At Wallasey, Cheshire, a very novel school has been established, the only one of its kind in this country. It is a school for training guide dogs for the blind. Only Alsatians are accepted. —female Alsatians!—as these dogs have proved themselves the most suitable for the work. The canine scholars enter the school when they are about fourteeen months of age. Before being admitted, however, each individual dog is

personally 'interviewed' by the trainer, Captain Liakhoff, who can tell, in a matter of minutes, whether or not his prospective pupil possesses the necessary qualifications. Provided that she does, her education begins forthwith; and should she prove an apt pupil she is given the qualification of G.D. on graduating from the school, which means that she is now a registered guide dog, and ready to take her place amongst the world's workers.

"It takes about three months to train a guide dog, and a further three to four weeks to train dog and owner together, but at the end of that time you have about as fine a working partnership as it is possible to find. While the new partnership is being established, however, dog and owner do not go out together, for dogs, unlike horses, will only work for those they love. The new owner's first duty, therefore, is to win the affection of his dog—seldom a difficult task, for dogs and owners are linked up appropriately according to temperament, etc. Should, however, misfits ever occur, fresh contacts are always made. During this preliminary period the trainer acts as guide dog when the owner goes for walks. Thus the owner has the services of a talking dog to begin with, and the real dog is spared a painful experience—and this loving consideration of the guide dog goes on not only throughout the entire training but right through all the years.

"The owner attends to the feeding and grooming of his four-footed friend from the very first, under the personal supervision of the trainer, and by the time his training is completed he has learnt more about the proper care of a dog than most people learn in the whole of their lives. His guide dog now becomes, of course, his first consideration, and in return she gives to him a love and devotion which, even to one accustomed to the devotion of a dog, is almost past believing. Indeed, the bond which exists between these two, is probably the closest that will ever be attained by man and beast.

"On the fourth day after their introduction to one another the two are usually ready to take the road for the first time—a great day indeed for the new owner, for it marks for him the beginning of his freedom. And this is only the first of many happy days to follow, for the training is one long laugh from start to finish; and at the end of it he returns home a seeing man as far as his capacity for getting about unaided is concerned. From now on he can get along as fast as his seeing companions—faster, in fact, than many—and what a boon that is to a blind man! And best of all, he can do it without attracting undue attention to himself, for his dog works so unobtrusively that as often as not they pass by unobserved.

"And now comes the inevitable question, 'How on earth does the dog know where to go?' Well of course the dog does not, but the owner does: And he directs his dog by means of three simple commands, 'Left,' 'Right,' and 'Forward.' Should he, however, be uncertain of his direction, he just stops a passer-by, as anyone else would, and asks his way. And this is the only kind of assistance that is acceptable, for the guide dog knows her job, and needs no help from others. Few people realise this fact, or the serious consequences that might result from interfering with a guide dog at her work, or surely they would refrain. The guide dog knows exactly what to do, and how and when to do it: but she must be allowed to do it in her own way. By all means help the owner all you can by telling him anything you think he ought to know: but give the dog a fair deal, too, by then walking away as quickly as you can, and leaving the two to work out their own problem in the way that seems best to them. This will do more for dog and owner than you imagine, for interference, in addition to endangering the safety of the owner, is definitely harmful to the guide dog, actually putting her off her work. And this applies especially to the time when the two are negotiating traffic. The dog knows when to stop, and when to go; and this information she conveys to her owner through the leather-covered handle of her harness, which he grips, and by which she guides him—but how can she convey it if you distract her?

"Finally, a word as to how the dogs themselves feel about their work. They love it: one glance at a guide dog getting into her harness would convince anyone of that. And as for their happy owners, they have been given the next best thing to sight. Do you wonder they are grateful beyond words?"

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PNEUMATIC EQUIPMENT FOR HORSE DRAWN VEHICLES

In the course of a well-illustrated brochure issued, under the above heading, by the Rubber Growers' Association, Mr. Alexander Hay states that the difficulty of carting on soft ground, especially during the winter season, necessitates the retention of horses as a normal means of transport on the majority of farms in this country.

"The provision of pneumatic equipment for horse-drawn transport in agriculture has," he continues, "developed in three stages, beginning with the utilisation of old motor car tyres and axles for light transport on the farm. Even the advantages of this "makeshift" equipment soon convinced farmers of the necessity for fitting pneumatic tyred wheels in place of the hitherto orthodox type. This led to the introduction of low-pressure balloon tyres, similar to aeroplane tyres, and these pneumatic tyres have been in use on farms for over four years, and have given satisfaction. The low-pressure aeroplane tyre was built originally to operate regardless of field conditions, to enable emergency landings to be made with safety, and not be become stalled in the mud during the rainy season. The success of these tyres led to the introduction of the land or agricultural tyres, which are now so popular in all parts of the country.

"The pneumatic tyre for use in agriculture is built to give many years of satisfactory service, and the tread is of a special pattern designed to offer the minimum rolling resistance. The shoulders are buttressed to provide protection from damage from flints, curbs or ruts, and the rubber used is specially compounded to resist farmyard acids. The plies forming the inner part of the cover are of special construction, and risks of punctures are slight. The wheels provided are of the steel artillery type, strong, light and durable, and equipped with roller bearing hubs. The chief advantages secured by pneumatic equipment are:—

(1) Loads at least 50 per cent. greater can be carried without additional effort.

(2) The pneumatic tyre does not sink in arable land, and carting is speedier and more economical.

(3) Loads are carried smoothly and silently and without damage.

(4) Carts, lorries and waggons of lighter construction and larger capacity can be used.

(5) A lower loading line can be obtained without sacrificing tipping advantages.

(6) Wheel maintenance charges are reduced, and the greasing of hubs is necessary only once every six months.

(7) More work can be done with horse labour and carting costs are reduced.

(8) The wheels are of standard type and may be interchangeable between vehicles used for different purposes.

Horse-Drawn Transport in Cities

"For short hauls and frequent halts, the horse is the most economical factor in traction haulage, and in narrow turnings and courtyards in the large cities there is a tremendous advantage in favour of the horse-drawn vehicle with its full lock, owing to the adaptability in turning more quickly and with less disturbance than the heavier type of motor vehicle. Pneumatic equipment is in demand for the light type of milk and bread delivery vans and for contractors' lorries. Recently a specially designed high pressure tyre has been provided for street work. It is maintained that the draught on the horse is considerably reduced and heavy loads can be carried with ease, and the continual stopping and starting is done with less effort. The tyres provided are supplied in sizes to carry weights from 12 to 70 cwt. and are proving very successful; the load rides on the tread and air carries the load.

"Arising from trials that have been conducted with pneumatic equipment for horse-drawn vehicles by a leading firm in this country, the following conclusions have been arrived at:—

(1) The tyres do not show the same amount of wear as on a mechanically propelled vehicle, owing to the absence of the grinding action that takes place, with, say, a motor car.

(2) If pneumatic equipment is fitted during construction the cost does not differ to any extent from the cost of the old fashioned wooden wheels.

(3) The horses are able to pull a heavier load on a tyred vehicle, which is illustrated by the following test figures:

(*a*) On a smooth, level surface, the initial tractive effort required to move from a stationary position a pneumatically equipped vehicle was 38 lb. against 79 lb. for the ordinary lorry pulling the same load and of the same unladen weight.

(*b*) On a paved gradient rising 1 in 46 the respective efforts necessary were 90 lb. and 180 lb.

(4) There is an advantage of braking where pneumatic equipment is fitted."

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DIET DURING PREGNANCY AND LACTATION

"During the last few years the problem of maternal mortality and morbidity has caused no little concern both in medical and in lay circles, and not a few observers have sought to correlate this wastage of life with faulty nutrition," states the *British Medical Journal*, of June 20th, and continues: "It is therefore opportune that Garry and Stiven have attempted to assess the dietary requirements of the woman during pregnancy and lactation by reviewing the literature and in particular the results of the nutritional experiments on animals. They conclude that 'any investigation into the causes of maternal morbidity and mortality should take into account the diet of the mothers.' Mortality associated with childbirth may be classified thus: puerperal sepsis; haemorrhage; the toxaemias of pregnancy; the accidents of childbirth; and diseases aggravated by pregnancy.

"It is reasonably certain that the only two of these categories which might be directly affected by diet are puerperal sepsis and the toxaemias of pregnancy. Some evidence has been advanced to suggest that the incidence of puerperal infections may be reduced by adding vitamin A to the diets of pregnant women, but the reports of more than one maternity hospital make it evident that childbed fever can be to all intents and purposes eliminated by good obstetrics. It follows that the only form of maternal morbidity and mortality which cannot be prevented by good midwifery and which may be due to dietetic factors is that associated with the toxaemias of pregnancy.

"It is a rather disconcerting fact that the dairy farmer knows more than the obstetrician about the food necessary to cause a good yield of milk. The lactating woman requires a higher intake of energy than the pregnant woman, for she expends from 350 to 700 calories a day on providing milk. In cows the protein intake would appear to be the most important limiting factor for lactation, although up to a point the protein may be provided at the expense of the animal's tissues. An abundant supply of fat of high quality is necessary to produce the best effects in lactation, and this cannot be supplied by the unsaturated fatty acids which have been shown to be essential to fertility. It has also been shown that free access to water increases the yield of milk in dairy cows. As might be expected, an adequate intake of calcium and phosphorus is essential, and in sows the second generation fed on a diet deficient in calcium are unable to suckle their second litter. Rats fed on a manganese-free diet failed to show any development of the mammae during pregnancy, while it has been shown that in some circumstances an increase of the iodine intake may increase the yield in cows. Successful lactation in rats is, moreover, dependent on the intake of the vitamin B complex and to a lesser extent on that of vitamin E. The mere quantity and quality of the milk are not, however, the sole factors to be considered. Its content of vitamin D may be increased by the administration of cod-liver oil, but the increase will only be sufficient to prevent the onset of, but not to cure established rickets in the offspring.

"The authors give a table showing their estimations of the daily human requirements of the various foodstuffs during pregnancy and lactation, and with their estimates no well-informed person is likely seriously to disagree. When this table is compared with the average dietary in this country there is every reason to doubt whether one pregnant woman in ten ingests half the suggested amounts of minerals and vitamins The authors conclude this valuable review in a most orthodox manner. 'Mellanby suggests a diet including daily two pints of milk, two servings of green vegetables (cabbage, kale, spinach, or lettuce), one or two eggs, fresh fruit (apples or oranges), sea fish twice or thrice a week and liver once weekly, with the possible addition of cod-liver oil.' The only criticism of such a diet is that it would cost two to three times the amount of money available to a large section of our population for the purchase of food."

ROLE OF ADENYLIC ACID IN VITAMIN B DEFICIENCY

Dr. T. W. Birch and Dr. L. W. Mapson, writing in *Nature* of July 4th, state that adenylic acid and adenosine (obtained from muscle or yeast) are found to accentuate considerably the slowing down of the heart-beat (bradycardia) produced in rats by deficiency of vitamin B. The authors find, further, that vitamin B helps in the elimination of adenylic acid and suggest that, when the vitamin is absent, there is an accumulation of adenylic acid and that it and similar decomposition products of nuclein are the cause of the bradycardia, not lactic acid, as sometimes stated.

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A FORTY-YEAR-OLD HORSE

To the list of horses—now of some length—which we have recorded as attaining the great age of 40 years and over, has to be added Jumbo, an inmate of the Home of Rest for Horses at Boreham Wood, Hertfordshire, where he had spent the last ten of his 40 years of life.

Owing to his great age Jumbo was the centre of attraction, and visitors were astonished when told of this exceptional age. His head has been presented to the Royal Veterinary College, Camden Town, and will be placed in the College museum.

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The Tortoiseshell "Tom."—"There are now seven tortoiseshell tom-cats in all England," states a daily paper, and adds: "During the last 36 years only 21 tortoiseshell tom kittens have been born in this country, and of these eleven were the property of Sir Claud Alexander, the cat breeder, of Horsham, Sussex, who has made a special study of them. Plenty of tortoiseshell female kittens are born, but, for some strange reason, the male variety is particularly rare. Nobody can tell why."

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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ROYAL (DICK) VETERINARY COLLEGE

Extension Fund Appeal

To the Editor of the Veterinary Record

Sir,—May I ask for a small amount of your space to intimate the conditions under which a contribution to the Extension Fund of this College has been promised. A friend and well-wisher of the College, who desires to remain anonymous, promises the sum of £50 provided a similar sum be contributed or collected by each of fifty other persons. The anonymous donor is a graduate of the College, and would like the other donors (or collectors) to be graduates also, but does not make this a rigid condition.

May I take this opportunity to make a personal appeal to all graduates and friends of the College, wherever they may be, to help in such manner and to such extent as they are able.

Yours faithfully,

O. Charnock Bradley,
Principal.

Royal (Dick) Veterinary College,
Edinburgh, 9.

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"SOUND IN WIND AND EYES—A GOOD HUNTER"

To the Editor of the Veterinary Record

Sir,—Mr. Cochrane-Dyet does not make it clear whether he is referring to horses sold at auction with a warranty of "Sound in Wind and Eyes" or to horses sold without such warranty, a certificate of soundness in that respect being lodged in the office, which of course is no warranty.

"Sound in Wind and Eyes" can only be taken as a bald statement of fact; that it should imply soundness of heart is unreasonable, it might just as well be said that it should cover lameness. If sold with a warranty, it is for the purchaser to verify such warranty and that is all that he can expect.

A horse sold as a "Good Hunter" must be "Sound in wind and eyes, quiet to ride, have been hunted and be capable of being hunted" and this must clearly be within the province of the veterinary surgeon, and would cover any functional disease of the heart, for such a horse would not be capable of being hunted, and could be returned.

Numbers of horses are "crabbed" for supposed diseases of the heart. Intermittency, either regular or irregular, accounts for a good many, but if the examiner would auscultate the heart in such cases after a real good gallop, he would more often than not be surprised to find the heart beats absolutely normal.

Mr. Railton rightly expresses doubt as to the possibility of making a correct diagnosis of heart disease, and distinguishing between various degrees, and whether of long standing or not. He further states that he would not give a certificate to say a horse was suffering from any disease of the heart unless he was certain beyond any doubt of the pathological lesion which existed.

I cordially agree with him, but fail to see how he is to arrive at such a diagnosis without a *post-mortem* examination.

Yours faithfully,

Gerald Bloxsome.

Rosemullion,
Southwick,
Sussex.

August 3rd, 1936.

The Editor acknowledges, with thanks, the receipt of the following:—

Communications from Sir Frank Colyer (London), Dr. J. Russell Greig (Moredun), Mr. P. J. Howard (Ennis, Co. Clare), Professor W. C. Miller (London) and Dr. F. C. Minett (London).

Report of a meeting of the Lancashire Division, N.V.M.A., from Mr. A. L. Mullen, Hon. Secretary.

Report of the 13th annual general meeting of the New Zealand Veterinary Association, from Dr. C. S. M. Hopkirk, Hon. Secretary.